THE IRON TRADE REVIEW

VOLUME XL | CLEVELAND, JANUARY 24, 1907 | NUMBER 4

STORM OF PROTEST

AGAINST ADVANCES IN SOUTHERN FREIGHT RATES

On Pig Iron Long Sold but Not Delivered—Weather Conditions Interrupt Many Operations—Structural Material Improves.

The extremely cold weather of the past few days and floods, especially in the Ohio river valley, have interfered with the operation of many plants, causing the banking of some furnaces, the stopping of two plants of the American Sheet & Tin Plate Co. and the cessation of work at numerous foundries in the Cincinnati district. The weather conditions have added to the embarrassment of the railroads and delivery of iron from the south, already long delayed, will be still further retarded. A storm of protest is arising from southern furnace interests and consumers of southern pig iron against the action of the railroads in that section in advancing freight rates, effective Feb. 1, on sold pig iron, the delivery of which has been delayed many months, as well as on iron to be sold after the first of next month.

Providing For Cars. The action of the Pennsylvania railroad in organizing a $100,000,000 car trust, following the announcement of a new issue of capital stock and bonds amounting to $200,000,000, has excited much interest, and is generally accepted as indicating unprecedented expenditures for freight cars. Although $25,000,000 of the trust certificates will be for payment on cars ordered for 1906 and $19,000,000 for cars already ordered for 1907, further heavy ordering at an early date is expected. The principal car interest is now in the market for 30,000 tons of pig iron for the last half of the year, and has placed an order for 5,000 tons of shapes, angles and plates. Railroad buying of structural materials is heavy. The only cause for anxiety as to railroads' purchases lies in the possibility that they will not be able to make financial provision for their very extensive requirements, as there is now unusual hestitancy on the part of the public in investing in railroad securities.

Pig Iron Sales. The week has not been noteworthy for large sales of pig iron, but there has been steady buying for the last half of the year and inquiries are numerous. Although the general tendency of prices has been upward, furnace interests in the central west are showing a conservative tendency in making quotations. Some inducement is offered buyers to cover for the whole of the last six months rather than for the third quarter. The coming into the market of many small buyers to cover for the last half of the year is significant.

Crude Steel. The supply of crude steel in the Pittsburg district is more nearly adequate than for some time, but there is still a shortage at Chicago. On account of the increased supply of sheet bars, sheet mills in the Pittsburg district are now operating nearly to their full capacity, but deliveries are still from 14 to 16 weeks belated.

Shapes and Plates. The buying of shapes has improved in the central west. Plates are still extremely strong and it is impossible to get anything like prompt delivery without paying premiums.

Old Material is Weak. Old material is the only weak feature of the market, and prices generally are sagging. Weather conditions have been unfavorable to the manufacture of coke, but the market shows little change.

NEW CAR TRUST

Formed by the Pennsylvania to Pay for Cars Ordered and for Future Requirements.

The Pennsylvania railroad has formed a $100,000,000 car trust, known as the Pennsylvania Freight Equipment Trust Co. It will be divided into 100 series of $1,000,000 each, to be issued as freight car requirements of the company necessitate. The trust will be perpetual and is entirely independent of any existing car trust in which the company is interested. Provision has already been made to issue from time to time throughout the present year 44 series, or $44,000,000, of their new trusts. This will provide for 21,000 freight cars, of 1906 delivery, some of which are yet to come from the builders, for which $25,000,000 in certificates will be issued, and 16,000 cars, of 1907 delivery, for which $19,000,000 in certificates will be issued. The new trust is entirely for freight equipment, the custom of the Pennsylvania railroad being to pay cash for its locomotives and passenger equipment.

ILLNESS OF W. C. McMILLAN.

W. C. McMillan, president of the Michigan Malleable Iron Co., is lying seriously ill with pneumonia at his home in Detroit. The illness has affected Mr. McMillan's heart, and has caused grave apprehensions for his recovery among his family and friends.

New Steel Casting Concern.—A new company is about to be incorporated to operate near Cleveland, in the manufacture of light crucible steel castings and later larger open-hearth steel castings. The assets of the Ohio & Pennsylvania Steel Co., operating under lease from the Continental Steel Co., of Chagrin Falls, have been taken over and it is expected that the plant which has already been located will be in operation in six weeks. The main building is 78 by 400 feet, and a 32-pot furnace will be installed with a capacity for the present of about 40 tons of light castings per week.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Furnaces Inclined to Name Lower Prices for Last Half.—Billets Easier.

Office of THE IRON TRADE REVIEW, 521 PARK BUILDING, Jan. 23

The general situation during the week under review has changed but very little since the preceding week; in fact, the only material change has been a little stronger inquiry for Bessemer and basic pig iron and foundry iron for extended deliveries. These, however, are not coming from the steel making concerns, but largely from makers of castings, malleable and car wheel concerns, only a few of the larger consumers of foundry iron having covered for their requirements for the last half of the year.

There has been no change in prices in finished lines, the enormous specifications still being the feature in this branch of the trade. New business is apparently light, most producers being in such filled up condition that they are not inclined to accept further contracts for far extended deliveries. This is particularly true of plates, steel bars and sheet products. Independent companies have heretofore tried to confine their business to deliveries through the first half only, but now find that it is necessary for them, in order to accommodate their regular trade, to go into the third quarter and last half. While they are doing this to some extent, it is as sparingly as possible, they being unwilling to obligate themselves further into the future than is absolutely necessary.

The floods in the Allegheny and Monongahela rivers on each side of Pittsburg have caused considerable inconvenience to manufacturing concerns in this district during the past two weeks, two plants of the American Sheet & Tin Plate Co. being put out of commission by high water, and others having suffered to a similar extent, and in the Connellsville coke region, mines and tracks have been flooded and this condition still exists to such an extent that it is impossible to get cars to many of the plants of the region in the vicinity of the Monongahela river.

Pig Iron.—Bessemer pig iron for second quarter delivery is now quoted $22.50 and basic at $22 valley furnace, and for last half this can be shaded about $1. The United Steel Co. of Canton during the past week bought 6,000 tons basic for third quarter delivery, but aside from this there has been very little steel making iron sold to the steel concerns, the greater part of the inquiry being from steel casting makers and foundries. The large steel making concerns evidently are not ready to place for their last half requirements at present quoted prices. Without any specific agreement being in evidence, merchant furnaces have shown an almost unanimous inclination toward lower prices during the last half of the year, this probably being brought about by independent producers who have bought their ore supply and are experiencing some anxiety on the score of disposing of their anticipated large production. There is a feeling also that steel making concerns cannot afford to buy on a continually rising market and rather than break the present run of general prosperity in this business, they have voluntarily made quotations ranging from 50c to $1 lower than prices quoted a month ago for these same deliveries. Southern furnaces report some very heavy sales for last half on a basis of $18.50 Birmingham on No. 2 southern, one concern alone having sold 18,000 tons during the week on this base, and sold 1,500 tons gray forge iron at $22.50 delivered Pittsburg for February to June delivery as noted. Second quarter northern No. 2 foundry is quoted $23 to $23.50. Prompt Bessemer is quoted $23. On second quarter delivery we quote as follows:

Bessemer Valley	22.50
Bessemer, Pittsburg	23.35
No. 1 Foundry, Pittsburg	24.85 to 25.35
No. 2 Foundry, Pittsburg	24.35 to 24.60
Gray Forge, Pittsburg	22.25 to 22.60
Basic, Valley	22.50
Basic, Pittsburg	23.35

Ferro-Manganese. — Several tonnages of imported 80 per cent ferro-manganese for spot shipment have been offered in this market at a trifle under $77 delivered Pittsburg and for third quarter delivery $71 has been quoted. There has been no change in 50 per cent imported ferro-silicon and we quote $108 to $110 nominal, and on 12 per cent, $36; and 11 per cent, $35.

Muck Bar.—As far as can be learned, there is no muck bar for sale in this market. Producers who formerly sold their surplus to outside interests are now using this surplus themselves, and the market is extremely limited. It is doubtful if consumers could offer to pay more than quoted prices, and we make a nominal quotation of $37, delivered Pittsburg, on all pig metal muck bar and $35 on part scrap bar.

Skelp.—We continue to quote the following nominal prices on iron and steel skelp, although there is practically no market for deliveries prior to the middle of March. On the light gages and narrow widths, with the usual differentials on heavier stock, we quote as follows:

Bessemer, grooved, 1.70c to 1.75c; sheared, 1.70c to 1.75; basic, grooved, 1.80c to 1.85c; sheared, 1.75c to 1.85c; iron skelp, sheared, 2.15c to 2.25c; grooved, 2c to 2.10c.

Plates.—As far as local mills are concerned, three months is about the best delivery that can be made on any new business taken on at this time, and the condition of the books of the leading interest is such that it has refused to take on further obligations and the additional requirements of consumers ore greatly in excess of any overflow capacity of the mills, although records for production have been broken in a great many instances since the first of the year. The urgent need for plates by the steel car interests is becoming more pressing and the pipe interests are making still further demands for material in order to meet the heavy specifications made against them for finished material. Local mills are still holding very firm at 1.70c base Pittsburg. Eastern mills have quoted on the base 1.90c their mill, equal to 2.06¾c Pittsburg, but as far as can be learned have only succeeded in picking up the floating business where absolute necessity makes it compulsory to pay this price. We quote as follows:

Tank plate ¼-inch thick, 6¼ to 100 inches, 1.70c f. o. b. mill Pittsburg. Light plate schedule, No. 10, 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Extras on the regular plate schedule are as follows per 100 pounds: Boiler and flange steel plates 0.10c; A. B. M. A. and ordinary firebox steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches,

0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gages under ¼-inch to and including 3-16-inch plates on thin edges, 0.10c; under 3-16 inch to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less than carloads. Terms, net cash in 30 days.

Sheets.—The specifications for sheets, both black and galvanized, have been abnormally heavy for this time of the year, and deliveries have been extended over twelve weeks until the average is now about 14 weeks on the general line of stuff. The advance in galvanized sheets has not been announced, but is expected almost daily on account of the high price of spelter. With the better supply of semi-finished steel, sheet mills have been running almost to the full percentage capacity. We quote as follows:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized, Nos. 10-11, 2.55c; Nos. 12-14, 2.65c; Nos. 15-16, 2.75c; Nos. 17-21, 2.90c; Nos. 22-24, 3.05c; Nos. 25-26, 3.25c; No. 27, 3.45c; No. 28, 3.65c; No. 29, 3.90c; No. 30, 4.15c. Corrugated roofing, $1.85 per square for No. 28 painted, 2½ inch corrugation and $3.15 per square No. 28 galvanized, 2½ inch corrugation. Blue annealed sheets, No. 10 and heavier, 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c.

Tin Plate.—High water and floods in the Pittsburg district necessitated shutting down two of the plants of the leading interest for several days last week, and this will seriously show on their shipments. Specifications being unusually heavy for this the off season in tin plate, consumers, including both the canning interests and others, are specifying much further ahead than usual and in a measure are becoming accustomed to the extended deliveries in a trade which has usually been comparatively prompt. There has been but very little third quarter business accepted, and this only from the heavy canning interests, producers not being ready at this time to make an official general quotation for the trade. Prices have not changed and we quote as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less two per cent for cash in 10 days.

Hoops and Bands.—There is practically no interest in this market at the present time, except from a standpoint of making and securing deliveries on specifications against standing contracts. The new business does not amount to anything, although the mills are working to capacity, but are unable to gain to any appreciable extent on shipments. We continue to quote unchanged as follows:

Hoops, in carload lots, 2c; in less than carload lots, 2.10c; bands 1.60c base, half extras as per standard steel card. Prices f. o. b. Pittsburg.

Rails and Track Material.—The inquiry for standard sections during the past week has been very heavy, but the actual business placed would not amount to very much over 10,000 tons, and during the first two days of the present week, the new business exceeded the total of the whole previous week. The new tonnage on light sections has fallen off considerably on account of the filled-up condition of the mills and inability to accept anything for delivery prior to June. We quote as follows:

Fifty pounds and heavier, 500-ton lots and over, $28; carloads and less than 500 pounds, $30; less than carload lots, $32; 8 pound, $40; 12 pound, $36 to $37; 16 pound, $35 to $36; 20 pound, $34 to $35; 25 to 45 pound, $33 to $34; angle splice bars for standard sections, $1.65; spikes, for forward delivery, $2.50 to $2.75.

Merchant Bars.—In spite of the very heavy movement in steel bars since before the 1.60c Pittsburg base became the official price and the feeling during the past month that the major part of the tonnage for the first six months of the year, at least, had been covered, there is still a considerable buying movement, and although the tonnages have not been large individually, the aggregate has been good and much more than was expected as the tail end of the big movement. The leading interest is comfortably filled up for practically the entire year, while independent interests have endeavored not to go past July 1, although business has been accepted for the last half of the year from old customers who do not care to take chances and wait until a later date before placing for their requirements. Specifications against existing obligations are very heavy. Bar iron is moving freely at 1.80c and 1.85c base for shipment into the Pittsburg district and 1.60c base Pittsburg plus freight to point of shipment from western mills. We quote as follows:

Common iron bars, 1.80c Pittsburg in carload lots and over, 1.85c in less than carloads; Bessemer steel bars, 1.60c; plow and cultivator, 1.60c, net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size 0.30c advance. Cold rolled and ground shafting, 50 per cent off in carload lots, and 5 per cent off in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c, sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Structural Material.—Construction companies are still out scouting for business, something they have not done until the past two weeks for several months, indicating that they are working through their present contracts pretty thoroughly, and are preparing for the spring erection work, a large amount of which is being prepared and in the hands of architects, and will be submitted for bids within a very short time. There is a large amount of railroad construction work in the air, but individually these jobs do not run in any great tonnage. The prosperity of the past year has made it necessary for a large number of additions to plants and much of the small construction work is along these lines. From a mill standpoint, the structural business is running along evenly, neither gaining nor losing, and this is viewed with satisfaction on account of the very heavy demands for semi-finished material for other lines. We quote as follows:

Beams and channels, 15-inch, and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.70c; angles from three to six inches inclusive 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.60c base.

Wire and Wire Nails.—There has been no change in the official quotations on wire products, although some producers are quoting 5c to 10c premium. On account of the sold up condition of their mills, absolutely no stocks have been accumulated for the spring rush, although material has been piled up at the mills on account of car shortage and inability to ship, everything finished being sold, and the usual spring demand having started about a month ago earlier than usual this year. We quote as follows:

Wire nails, jobbers' carload lots, $2; retailers' carload lots, $2.05; less than

carloads $2.10; painted barb wire, $2.15, for jobbers in carloads; retailers in carloads, $2.20; and less than carloads, $2.30, with 30c for galvanizing; plain wire, $1.85 for jobbers and $1.90 by carload.

Merchant Pipe.—Conditions have not changed since last report and producers are so far filled up for the next three months as to make it extremely doubtful if new business for delivery prior to that time would be accepted, the probability being against the acceptance of anything under three to four months. Prices are very firm, jobbers' discounts being 77 base, base sizes, and 5; consumers' carloads best discounts are as follows:

	Steel black	galv.
⅛ to ¼ inch	67	51
⅜ inch	69	55
½ inch	71	59
¾ to 6 inches	75	65
7 to 12 inches	70	55
EXTRA STRONG PLAIN ENDS.		
⅛ to ⅜ inch	60	48
½ to 4 inches	67	55
4½ to 8 inches	63	51
Double extra strong plain ends, ⅛ to 8 inches	56	45

Boiler Tubes.—In addition to the already heavy business on the books, there is a fair volume of new business and requests for delivery on specifications are urgent. There has been no change in prices and we continue to quote as follows:

Boiler tubes.	Steel	Iron
1 to 1½ inches	48	48
1¾ to 2¼ inches	60	43
2½ inches	62	43
2¾ to 5 inches	68	55
26 to 13 inches	60	43

Less than carloads two points less.
2½ inches and smaller, over 18 feet, 10 per cent, net, extra.
¾ inches and larger, over 22 feet, 10 per cent, net extra.

Steel.—The fact that independent producers of semi-finished material have done considerable offering in this market during the past two weeks has made the situation somewhat easier and the supply has been accordingly better. Ordinary soft Bessemer billets are qoted $29.50 Pittsburg and open-hearth $32 to $33. With the regular producers, the supply has not improved materially for the open market or on contract, on account of the very heavy demand for semi-finished material in their finishing departments.

Coke.—There has been some improvement in the demand for foundry coke, attributed to the consumers having used up stocks accumulated before the first of the year in anticipation of the shortage, and users who have held up shipment since that time are again receiving coke. There is a slight improvement in the demand for furnace coke as well. The coke plants in the Connellsville region bordering on the Monongahela river have been out of business the greater part of the past week, on account of high water flooding or undermining tracks, and it has been impossible to ship from these places. Some of the plants have been shut down on account of the high water in the flooded district filling their mines. There has been no change in price and furnace coke for spot shipment is quoted at $3.75 and on contract $3.40 to $3.50 for shipment prior to July 1 and $3.10 to $3.15 for the year. Foundry coke is quoted at $3.90 to $4.15 for spot, and $3.75 to $4 for first half, $3.75 on contract for the remainder of the year.

Old Material.—The open winter and the apparent anxiety of dealers to dispose of their holdings accumulated during the advance, together with other inexplainable reasons, have combined to create a weakness, which is not borne out by general conditions, prices being lower and the trading confined almost exclusively to the dealers. The large consumers of scrap, being comfortably filled up, are threatened with embargoes at their plants. We quote as follows, delivered in the Pittsburg district:

Heavy metling scrap, $18.50 to $19; re-rolling rails, $21 to $21.50; bundled sheet scrap, $16 to $16.50; iron axles, $30.50 to $31; old iron rail, $26 to $26.50; No. 1 wrought scrap, $20 to $20.50; old car wheels, $23 to $23.50; low phosphorus scrap, $22 to $22.50; machine shop turnings, $14.75 to $15.25; axle turnings, $15 to $15.50; cast borings, $12.25 to $12.50; No. 1 cast scrap, $20 to $20.50.

CHICAGO.

Pig Iron Prices Still Tending Upward.—Heavy Inquiry for Cast Iron Pipe.

Office of THE IRON TRADE REVIEW, 1362 MONADNOCK BLOCK, Jan. 22.

Local conditions are not sensibly changed. Pig iron is the absorbing topic, and its steady movement and upward trend are dominating features of the present situation. Transportation facilities have been greatly marred by the storms of the past week, and an unprecedented demand for spot iron is one of the contingencies expected.

Considerable interest is manifested in the proposed cast iron pipe purchase of the city of New Orleans because of the effect its letting might have on pig iron as well as on pipe, and because of the speculation it permits on future prices of the raw and finished product. The specification calls for the delivery of 13,000 tons this year, and 25,000 tons in 1908. This year's requirements are to be delivered in the next ten months, shipments to commence immediately after the letting of the order; while the delivery of the 1908 requirements is to be completed in fourteen months, commencing with September, 1907. The first year's installments will be almost wholly of 20 to 42-inch pipe, while the bulk of the second year's requirements are 4 and 6-inch pipe. The letting is scheduled for Wednesday, Jan. 23, and it is the current belief that the entire order will be awarded.

Specifications for finished material show no evidence of declining. They are abnormally large for plates, steel bars and sheets, in each of which mills are months behind in deliveries. Structural steel is improving, though the increased tonnage is almost wholly from railroads and carbuilders. Building work is seasonably dull, and specifications from contractors naturally are light. There is a good inquiry for light and heavy rails, and a few small sales of the latter to traction enterprises have been made at $30, mill. Scrap continues weak and prices are lower.

Pig Iron.—Buying has been remarkably free in the week under review. The bulk of the business placed is still for the third quarter and last half. Inquiry for the second quarter has perceptibly diminished, a fact which may be attributed to the difficulty experienced in placing orders for that delivery. Both the Sloss and Tennessee interests have withdrawn from the market for the first half, while northern furnaces are selling so sparingly as to amount to an inhibition of this shipment on their part.

What tonnage for the second quarter there may be left is being held for disposal at a later date as spot iron, for which there is sure to be a great demand and at considerably higher prices later in the year. The congestion of freight on southern yards has been increased by the floods and gales of the past week. Cars that left Birmingham as far back as Oct. 30 are only just arriving at their destination, having been as many as 70 days in transit from the furnace to the Ohio river. That stream is now a raging torrent, and with the transfer yards at Cincinnati, Louisville and Evansville reported under water, blockage of indefinite duration may be expected.

A more active movement for spot iron is already noted, one interest having sold nearly 100 cars in the past week. The quotation for that shipment remains at $23, Birmingham. The trading in northern irons continues without diminution, though malleable interests are not buying as freely as before.

Prices for the last half have advanced, the minimum for local No. 2 foundry and malleable Bessemer now being $24, Chi-

cago. Before the price of $22 was withdrawn last week, heavy tonnage was placed at this figure, among the purchasers being the International Harvester Co., which contracted for its last half requirements in malleable, amounting to an 18,000 tons. This interest is now sounding the market on its gray iron requirements. Southern No. 2 for the third quarter ranges from $18.50 to $19.00, Birmingham; for the second quarter, $22, Birmingham, is asked.

Virginia quotations are without change, being $23 furnace for the first half, $21 for the last half and $22 for the entire year.

We have revised our prices, the maximum quotations below being for second quarter and the minimum for third quarter deliveries:

Lake Superior charcoal	$26.00 to 26.50
Northern Foundry No. 1	24.50 to 26.00
Northern Foundry No. 2	24.00 to 25.50
Northern Foundry No. 3	23.50 to 25.00
Northern Scotch Foundry	24.00 to 26.00
Ohio Strong Softeners No. 1	25.30 to 26.30
Ohio Strong Softeners No. 2	24.80 to 25.80
Southern Foundry No. 1	23.85 to 26.85
Southern Foundry No. 2	23.35 to 26.35
Southern Foundry No. 3	22.85 to 25.85
Southern Foundry No. 4	22.35 to 25.35
Southern No. 1 Soft	23.85 to 26.85
Southern No. 2 Soft	23.35 to 26.35
Southern Gray Forge	21.85 to 23.35
Southern Mottled	21.35 to 22.85
Southern Silveries 4 per cent to 6 per cent Silicon	26.35 to 28.35
Jackson Co. Silveries, 8 to 10 per cent Silicon	32.30 to 33.30
Malleable Bessemer	24.00 to 25.50

Billets and Rods.—The output of several finishing mills in the west is curtailed because of the insufficent supply of billets. It has not been uncommon for large makers to supplement their production with purchases in the open market, and several transactions of this character have been recorded in the past few weeks. Under the circumstances, it becomes increasingly difficult to place new merchant tonnage with producers; and with the prospects of very slow improvement during the winter, it is not expected there will be any weakening ov values. In the week past, a specification of several thousand tons of axles was placed with a leading maker, and an inquiry for 5,000 tons was received from another consumer. Chain and wire rods are quoted on the basis of $36 to $37 Pittsburg, and forging billets from $38 upwards f. o. b. Chicago.

Iron and Steel Bars.—A goodly tonnage of new business has been placed with bar iron mills, and there is a fair amount under negotiation. Specifications continue active, all the local mills having their capacity engaged several weeks ahead. Prices continue without change on the basis of 1.60c to 1.65c Pittsburg, according to the amount required and the delivery desired. Contracting for steel bars for the last half is proceeding satisfactorily. Western mills are not catching up on deliveries very rapidly, being prevented by the remarkable influx of new specifications. Hard steel angles continue firm at 1.75c f. o. b. mill. We quote other prices as follows:

Soft steel bars and bands, 1.76½c, half extras; soft steel angless less than 3 x 3, 1.86½c; hoops, 2.16½c base, full extras; old rail stock, 1.70c. We quote bar iron from stock, 2.25c, full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $2, half extras; soft steel hoops, 2.40c to 2.50c full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Sheets.—The demand for sheets continues insatiate. Producers are literally overwhelmed with specifications and appear unable to make any headway on delinquent tonnage. Rumors continue current that an advance in prices is imminent. In the meantime, premiums of $1 a ton are asked for quick shipment. Jobbers report an active movement from warehouse stocks, with great difficulty experienced in replenishing same. We quote carload lots as follows:

Black sheets, Nos. 8, 9 and 10, 1.85c Pittsburg; No. 28 gage, 2.60c Pittsburg. Galvanized sheets No. 28 gage 3.65c Pittsburg. Freight to Chicago 16½c per 100 pounds. Jobbers' prices on less than carload lots from store are as follows: Black sheets, No. 10, 2.20c to 2.30c; No. 12, 2.25c to 2.35c; No. 14, 2.30c to 2.40c; No. 16, 2.40c to 2.50c; Nos. 18-20, 2.70c to 2.80c; Nos. 22-24, 2.75 to 2.85c; No. 26, 2.80c to 2.90c; No. 27, 2.85c to 2.95c; No. 28, 2.95c to 3.05c; No. 30, 3.35c. Galvanized sheets, Nos. 10 to 20, 3.30c to 3.35c; Nos. 22 and 24, 3.45c to 3.50c; No. 26, 3.65c to 3.70c; No. 27, 3.85c to 3.90c; No 28, 4.05c to 4.10c; No. 30, 5.25c to 5.30c.

Plates.—No apparent change is noted in the local situation. New tonnage and specifications are extremely heavy. Deliveries are slow, especially on universal plates, for which it is an easy matter to obtain premiums for quick shipment. Prices are very firm, as follows:

Tank steel, ¼-inch and heavier, up to 100 inches wide, 1.60c to 1.90c Pittsburg base. For extras see Pittsburg report. Freight rate to Chicago is 16½c per hundred pounds.

Jobbers' prices for shipment from local stocks are as follows. Tank steel ¼ inch and heavier, up to 72 inches wide, 2.10c; 72 inches up to 96 inches wide, 2.20c; 3-10 inch up to and including 60 inches wide, 2.20c; 3-16 inch, 72 inches wide, 2.45c; No. 8, up to 60 inches wide, 2.25c; flange steel, 25c extra; heads, 25c extra.

Structural Steel.—Railroads continue the biggest factors in the present buying movement. The C. M. & St. P. railway has closed for an additional 1,500 tons of fabricated shapes with the Pennsylvania Steel Co., while an aggregate of 20,000 tons is being figured on with other transportation interests. The American Bridge Co. reports contracts for 350 tons for the new power house of the Heath & Milligan Paint Co., and 350 tons for a coal handling bridge and three towers for the D. M. & N. R. R. to be erected at Duluth, Minn. Specifications from local fabricators are light, but with the nearer approach of spring an active movement is anticipated, judged by the enormous tonnage under negotiations for various office buildings and local enterprises. We quote as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from that city to Chicago is 16½c per 100 pounds. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.05 to $2.10 per 100 pounds; angles over six inches, $2.15 per 100 pounds base; beams, three inches to 15 inches, inclusive, $2.05 to $2.10 per 100 pounds base; channels, three inches and larger, $2.05 per 100 pounds base. Less than carload lots are $2 a ton higher than foregoing price.

Rails and Track Supplies.—There is an active inquiry for standard and light sections, and one or two small lots of the former have been closed on the basis of $30 mill. The filled-up condition of the Illinois Steel Co. on heavy sections is resulting in the diversion of all inquiries to the Carnegie Steel Co. Track supplies continue in good demand, and 2.50c mill is the lowest price that will be considered on either spikes or bolts for the merchant trade by western manufacturers. We quote as follows:

Bessemer rails, $28 to $30; less than 500-ton lots, $32; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $33; 25-pound, $34; 20-pound, $35; 16-pound, $36; 12-pound, $37, and lighter sections down to 8-pound, $43.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. Angle bars in large lots are quoted 1.65c to 1.75c; for smaller quantities, 2.25c to 2.75c; spikes, large lots, 2.25c; for

smaller quantities, 2.50c; bolts, large lots, 2.65c to 2.75c; smaller lots, 2.85c with square nuts, and 3c with hexagon nuts.

Merchant Steel.—Mills are moving their material forward as promptly as circumstances will permit. The heavy specifications, coupled with the car shortage and the congestion in the intermediate steel departments, however, have produced a slight delay to shipments. Prices remain firm at the following quotations:

Planished or smooth finished tire steel, 1.96½c; iron finish, up to 1½ x ½ inch, 1.91½c; base iron finish 1½ x ½ inch and larger, 1.76½c, base; channels for solid rubber tires, ¾ to 1 inch, 2.26½c, and 1⅛ inch and larger, 2.16½c; smooth finished machinery steel, 2.01½c; flat sleigh shoe, 1.81½c; concave and convex sleigh shoe, 2.06½c; cutter shoe, 2.35c; toe calk steel, 2.31½c; railway spring,. 1.96½c; crucible tool steel, 6½c to 8c, and still higher prices are asked on special grades. Shafting is very strong and an advance is expected. Quotations are without change at 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Cast Iron Pipe.—Inquiry for this product is heavier than in years. Municipal wants are slow in coming forward, but specifications from gas companies and other private interests are unusually brisk. The St. Paul Gas Co. and the city of St. Paul, Minn., are in the market for 1,200 tons and 2,000 tons, respectively. Interest centers in the New Orleans requirements of 38,000 tons, which will be let tomorrow. This contract will be split into two sections, 13,000 tons for delivery this year, and 25,000 tons in 1908. Over 20 000 pieces of pipe will be required to complete the 1907 specifications, divided as follows: 387 lengths of 42 inches; 8 of 36 inches; 1,025 of 30 inches; 486 of 24 inches; 2,124 of 20 inches; 1,060 of 16 inches; 7,513 of 12 inches; 53 of 10 inches; 3,509 of 8 inches; 3,500 of 6 inches, and 385 of 4 inches. More than one-half of the 25,000 tons for next year's delivery will be of 4-inch and 6-inch pipe, 40,000 pieces of the former and 55,200 pieces of the latter being required to complete the specifications for those sizes on that shipment. The tonnage for delivery this year is to be completed in ten months from date, and the shipments in 1908 in fourteen months, commencing with May, 1907. We quote prices without change as follows: Four-inch water pipe, $37; 6, 8, 10 and 12-inch, $36; gas pipe, $1 a ton higher.

Merchant Pipe.—No diminution is noted in the volume of specifications. Deliveries, however, continue slow. Jobbers and consumers are covering freely for spring wants, anticipating a heavy consumption when the building season opens. Prices are firmly maintained on the following basis: ¾ to six-inch black steel pipe 75.35 per cent discount; galvanized, 65.35 per cent discount. From store in small lots, Chicago distributors are asking 72 to 73 per cent discount on the base sizes.

Boiler Tubes.—Local jobbers report a brisk movement for all kinds of tubing. Shipments from mills continue slow and it is becoming a great problem to maintain in local warehouses a full line of sizes. Prices continue very firm. We quote official discounts, Chicago delivery, mill shipments, as follows:

2¾ to five inches, steel, 66.35; iron, 55.35; seamless, 50.35; 2½ inches and smaller, and lengths of over 18 feet, and 2½ inches and larger, and lengths over 22 feet, 10 per cent extra. On less than carload lots from store, we quote 60 off for steel; 47½ for iron, and 42½ for seamless.

Wire Products.—The operation of wire plants has been curtailed in the past week by the floods and gales that have prevailed all over the country. Further delays to shipments are expected from these causes and with slight improvement noted either in the supply of cars or of raw material, the hope of catching up on delinquent deliveries is materially diminished. New tonnage and specifications show no diminution, the movement being such that the leading interest finds it impossible to maintain stocks of any importance at any of its plants. Jobbers' quotations, Chicago delivery, are as follows:

Wire nails, $2.15; painted barbed wire, $2.30; galvanized barbed wire, $2.60; smooth annealed wire, $2.30; polished staples, $2.30; galvanized staples, $2.55. Carload lots to retailers, five cents higher; less than carload lots, 15 cents higher.

Coke.—Buying is light in the local market, the bulk of the trade being covered for the greater part of its wants this year. Shipments show an improvement, though they are not yet up to contract requirements. We quote Connellsville 72-hour brands from $4.15 to $4.50 ovens, according to grade and delivery. By-product coke is firm at $6.90 to $7.15 Chicago.

Old Material.—Scrap continues its retrograde movement. Local mills are not active participators in the market, buying only such lots as may be offered them at attractive prices. The tightness of the money market, coupled with the large stocks very generally held, has forced a number of dealers to unload at whatever price they could get, with resulting weakness to the entire line. The Illinois Central list of 5,000 tons is still on the market, which is supplemented this week with a new list for 4,150 tons from the C., B. & Q. railway. The biggest drop is in iron car axles, which have declined $2 a ton. Reductions of 50 cents a ton and over are also noted in Nos. 1 and 2 railroad wrought frogs, switches and guards, shafting, boiler punchings, cut boilers, iron axle turnings and railroad malleable. We have revised our prices, and quote as follows gross tons being given in the first paragraph:

Old Steel Rails (4 feet and over)	$19.50 to 20.50
Old Steel Rails (less than 4 feet)	19.00 to 19.50
Old Car Wheels	24.75 to 25.00
Old Iron Rails	26.00 to 26.50
Relaying Rails, subject to inspection	29.00 to 30.00
Frogs, Switches and Guards	17.00 to 17.50
Heavy Melting Steel	17.00 to 17.50
Mixed Country Steel	14.50 to 15.00

We quote net tons, as follows:

No. 1 R. R. Wrought	$16.00 to 16.50
No. 2 R. R. Wrought	15.00 to 15.50
Shafting	17.50 to 18.00
Dealers' Forge No. 1	12.50 to 13.00
Wrought Pipe and Flues	12.00 to 12.50
No. 1 Cast, 150 pounds and less	18.00 to 18.50
No. 1 Mill	10.50 to 11.00
Mixed Busheling (No. 1 & No. 2)	11.50 to 12.00
Country Sheet	9.00 to 9.50
No. 1 Boilers Cut	11.50 to 12.00
Boiler Punchings	15.00 to 16.00
Iron Car Axles	25.00 to 25.50
Steel Car Axles	22.00 to 22.50
Iron Axle Turnings	11.00 to 11.50
Cast Borings	8.75 to 9.00
Mixed Borings, etc.	8.75 to 9.00
Machine Shop Turnings	11.00 to 11.50
Railroad Malleable	17.00 to 17.50
Agricultural Malleable	16.00 to 16.50
Stove Plate and Light Cast Scrap	14.50 to 15.00
Old Iron Splice Bars	22.00 to 22.50

CLEVELAND.

Ore Shipments Expected to Amount to 40,000,000 tons this year.—Improvement in Shapes.

Office of THE IRON TRADE REVIEW, Browning Building, Jan. 22.

Iron Ore.—Ore interests are confidently expecting that 40,000,000 tons will be shipped this year. Last year the Pittsburg Steamship Co. shipped 11,355,000 tons in its own bottoms, and this year will be able to ship about 2,000,000 tons more. The extremely cold weather of the past few days has checked the movement from docks to furnaces. The car supply is adequate at present, but it is anticipated that there will be a shortage as spring approaches. We quote as follows: Old Range Bessemer, $5.00; Mesabi Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.00.

Pig Iron.—Buyers who have not fully covered for their requirements for the last half of the year are finding considerable difficulty in placing their orders, and some of them will doubtless be com-

pelled to use foreign iron. While inquiries for the last half are numerous, and while there has been steady buying for that delivery, many jobbing interests show a disposition not to cover for their full requirements until they are well provided with contracts for castings. The usual quotation for the last half is $22 for No. 2 foundry. One dollar more is asked for third quarter. We note the sale of 6,000 tons of basic for third quarter to a Canton concern at about $21 furnace. One interest which finds that its furnace is producing more basic than was expected is able to sell at $23 for prompt shipment. For last half we quote f. o. b. Cleveland as follows:

Bessemer	$21.50 to 22.00
No. 1 Foundry	22.50 to 23.00
No. 2 Foundry	22.00 to 22.50
No. 3 Foundry	21.50 to 22.00
No. 2 Southern	21.85 to 23.35
Gray Forge	20.50 to 20.75
Lake Superior charcoal	26.00 to 27.00

Coke.—The market has not been very active and prices are not so firm, with foundry selling at $4.15 to $4.25, and furnace at $3.50 to $3.65 ovens.

Finished Materials.—The jobbers who enjoyed unprecedented sales during the last year report that the new year starts with fully as encouraging prospects. Mills are far behind on nearly all products, especially on sheets and plates, although some independent interests are giving prompt delivery of plates, on which they receive a premium. The principal producer of steel bars is sold far ahead and leading makers of bar iron are in similar position. There is marked improvement in structural material, specifications having come in rapidly within a few days. Indications are that new buildings and new ships will soon require such a large tonnage that mills will not be able to give the prompt shipment which they have been making for some time past.

Old Materials.—An unsettled market confronts dealers. Most grades are very weak, but a few which are in steady demand with the mills are holding their own. A strong effort is being made to clean up January contracts and this force is helping to bolster up the sagging market temporarily. February is looked upon with uncertainty by dealers and sentiment inclines toward the bearish. If the present weather continues for any length of time, it is believed in some quarters that a general accumulation which cannot be moved will result in a stiffening of the market. When more favorable transportation conditions prevail, and this material appears prices will undergo a reverse movement. We quote Cleveland delivery, gross tons, in the first paragraph as follows:

Old iron rails	$25.00 to 26.00
Old steel rails (over 6 feet)	18.50 to 19.50
Old steel rails (under 6 feet)	18.00 to 19.00
Old car wheels	21.00 to 21.50
Steel boiler plate	14.50 to 15.00
Steel axles	21.00 to 22.00
Malleable iron (railroad)	19.50 to 20.00
Malleable iron (agricultural)	15.50 to 16.00
Heavy steel	16.50 to 17.00
Country mixed steel	14.50 to 15.50
Low phosphorus	23.00 to 24.00

We quote net tons as follows:

No. 1 R. R. wrought	$18.00 to 18.50
No. 1 busheling	15.00 to 15.50
No. 1 machine cast	18.00 to 18.50
Iron axles	25.50 to 26.00
Axle turnings	13.50 to 14.00
Wrought turnings (free from cast)	12.00 to 12.50
Grate bars	14.00 to 14.50
Pipes and flues	14.50 to 15.00
Tank iron	11.50 to 12.00
Hoop and band iron	8.50 to 9.00
Sheet iron	7.50 to 8.00
Wrought drillings	12.00 to 12.50
Stove plate	14.00 to 14.50
Cast borings	9.00 to 9.50

CINCINNATI.

High Water Interferes with Deliveries and Furnace Operations.

January 22.

Pig Iron.—Considerable buying has been done the past week and some round lots of from 2,000 to 4,000 tons have been included in the sales. Northern malleable was bought by a large manufacturer of agricultural implements for the second half delivery at about $21.00 at furnace. There has been more inquiry for the lower grades, both for forward and near deliveries. This has located some prices for gray forge. Spot gray forge is obtainable as low as $19.50, Birmingham, and for second quarter quotations as low as $18.50, Birmingham, have been made. Some last half gray forge sold at $17.00, which was in line with the regular schedule based on $18.- Birmingham, for No. 2 foundry. Several large melters are in the market calling for iron for delivery in the second quarter. In a general way there has been no change in the market so far as price schedules are concerned. An occasional quotation of $18.00, Birmingham, comes out for last half delivery, but the market is well maintained at $18.50 to $19.00 as a rule. Northern iron has sold at $21.00 at furnaces for No. 2, although the asking price is mainly $22.00 at furnace, for the last half. In this connection it has been stated by a good authority that fully 60 per cent of the northern iron in southern Ohio available for the second half of the year has been contracted.

Southern iron for second quarter delivery is going at $21.00 to $22.00, Birmingham, with but few furnaces able to offer any considerable tonnage of high grades. Northern iron for second quarter is quotable at $23.00 to $24.00, with but little offered.

First quarter southern iron is quoted at $22.00 to $23.00, Birmingham, with spot southern at $23.00 to $23.50, Birmingham, for No. 2. On the near deliveries the differences between the grades is one dollar per ton instead of the regular schedule difference of fifty cents.

Northern spot iron is quoted at $25.00 to $26.00 at furnace. Spot iron is here- with quoted, delivered Cincinnati, as a basis for settling contracts based on our quotations:

Southern foundry No. 1	$26.50 to 27.50
Southern foundry No. 2	26.00 to 27.00
Southern foundry No. 3	25.00 to 25.50
Southern foundry No. 4	24.00 to 24.50
Southern fdry, No. 1 soft	26.50 to 27.50
Southern fdry, No. 2 soft	26.00 to 27.00
Gray forge	22.50 to 23.00
Northern foundry No. 1	26.65 to 27.75
Northern foundry No. 2	26.15 to 27.15
Northern foundry No. 3	25.65 to 26.65
Jackson County silvery, 8 per cent	31.15

The high water at Cincinnati is interfering with transportation through this city to an important extent and is preventing deliveries, as a large part of the tracks in railroad yards are submerged. It has also made it necessary for furnaces in the Ironton district to bank. It is reported that Hamilton, Nellie, Bird, Union and Ashland furnaces are banked. Many of the foundries here are also in the flooded districts. We quote for second quarter delivery delivered Cincinnati as follows:

Southern Foundry No. 1	$24.50 to 25.50
Southern Foundry No. 2	24.00 to 25.00
Southern Foundry No. 3	23.00 to 24.00
Southern Foundry No. 4	22.00 to 23.00
Southern Foundry No. 1, soft	24.50 to 25.50
Southern Foundry No. 2, soft	24.00 to 25.50
Gray Forge	21.50 to 22.00
Northern Foundry No. 1	24.80 to 25.15
Northern Foundry No. 2	24.15 to 24.65
Northern Foundry No. 3	23.65 to 24.15
Jackson County Silvery, 8 per cent	28.15 to 29.15

Coke.—There is a slightly easier tone to the market, but no change in prices. Deliveries on contracts have been better and this has made the demand for prompt shipment coke less urgent. It is believed, however, that the interference with traffic movement by floods will have its effects, as coke from some of the fields cannot be moved over some of the lines heading to some fields. Quotations in the leading coke producing districts are as follows:

Wise County, Va. Furnace Coke prompt shipment	$3.25 to 3.50 per ton
Wise County, Va. Foundry Coke	4.00 to 4.50 per ton
Pocahontas Furnace Coke prompt shipment	3.25 to 3.50 per ton
Pocahontas Foundry Coke	3.50 to 4.00 per ton
Connellsville Furnace Coke prompt shipment	3.25 to 3.50 per ton
Connellsville Foundry Coke	4.15 to 4.50 per ton
New River Foundry Coke on contracts	3.50 to 4.00 per ton
New River Furnace Coke, prompt shipment	2.75 to 3.00 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.70 to $1.75 per ton on $9.00 pig iron, plus 19 to 20 per cent of the advance on pig iron above $9.00 Birmingham.

Finished Material.—The market was firm and there was a good demand for small lots from store. Retail prices for filling orders here are as follows:

Angles 3 x 3 and over, 2.15c to 2.25c; beams and channels 15 inches and under 2.15c; small angles and architectural channels, 2.10c base; plates ¼ inch and heavier, 2c; 3-16 inch, 2.10c; No 8, 2.10c; sheets (blue annealed) No 10, 2.15c; No. 12, 2.20c; No. 14, 2.25c; No. 16, 2.35c; box annealed sheets Nos. 18 and 20, 2.50c; Nos. 22 and 24, 2.60c; Nos. 25

and 26, 2.65c; No. 27, 2.70c and No. 28, 2.80c. Iron and steel bars 1.95c base; boiler tubes, 6 per cent off base; turn buckle 45 per cent off; rivets, 3.15c base; cold rolled shafting 45 per cent off list; steel tire, 2.10c base.

Old Material.—While the tone of the market is easy, dealers' prices to consumers are about the same as for the preceding week. There is a fair consumption of scrap and holders are not inclined to shade quotations. We quote:

Old No. 1 railroad wrought, net tons	$18.50 to 19.00
Cast machine and foundry, net tons	18.50 to 19.00
Old iron rails, gross tons	26.00 to 27.00
Old steel rails, gross tons	19.00 to 20.00
Old short lengths, gross tons	19.00 to 19.50
Old iron axles, net tons	26.00 to 27.00
Heavy melting scrap, gross ton	20.00 to 21.00
Stove plate, net tons	14.00 to 14.50
Wrought turnings, net tons	12.00 to 12.50
Cast borings, net tons	9.00 to 9.50
Car wheels, gross tons	20.50 to 21.00

PHILADELPHIA.

Belated Buyers Find Difficulty in Placing Their Orders.

January 22.

Pig Iron.—An interesting feature of the present situation is the discovery by producers that an unexpectedly large number of consumers, both big and small, have not as yet covered their requirements for the second quarter, and so, of course, have done nothing as regards the second half. Their abstention from buying has been due to the expectation of lower prices, but it begins to look now as if they would not only be disappointed in this regard, but would soon be instrumental in boosting prices still higher by their urgent demands for iron. Nearly all furnaces in this territory are practically sold up for the first half, and largely for the second half, and it is hard to see where these belated buyers are going to get their supplies. The English iron coming in will help a little, as it has for the past ten months, but the situation looks serious. Knowledge of these facts keeps the market very strong, and there is absolutely no disposition to make any concessions. Fancy prices are asked for spot shipments, running as high as $29 for No. 2 X foundry, and very little is to be had. There has been less activity in the last week than seems to be the case with the western markets, judging by the reports received, but this is not to be taken as an indication of weakness. Prices, which show little change, may be quoted as follows:

No. 1X Foundry	$26.50 to 27.00
No. 2X Foundry	24.00 to 24.75
No. 2 Plain	23.25 to 23.75
Standard Gray Forge	22.50 to 23.00
Basic	24.00 to 24.50
Low Phosphorus	27.50 to 28.00

New Material.—The market keeps on the even tenor of its way, the recent advances in prices appearing not to have the slightest effect in diminishing business, which continues in great volume.

An interesting incident, as forecasting big demands from the railroads for a long time to come for the plates, structural material and other forms used by them, is the announcement of the formation of a $100,000,000 car trust by the Pennsylvania Railroad, quite independent of the recently announced $200,000,000 increase in capital. While this will be extended over a number of years, it is significant of the confidence in the future felt by the railroad.

The demand for steel and iron is reported strong, but prices remain unchanged as follows: Beams, channels and angles according to specifications, 1.83½c to 2c; refined iron bars, 1.89½c to 1.93½c; steel bars, 1.83½c to 1.88½c; plates, 2.13½c to 2.18½c.

Old Material.—Unlike the other markets, that for scrap is rather weak, and prices have continued to droop, in some cases as much as $1 a ton. Buying has been quiet, a fact to which the decline is attributed. Prices may be quoted as follows:

Old steel rails	$19.50 to 20.00
No. 1 steel scrap	18.50 to 19.00
Old steel axles	22.50 to 23.00
Old iron axles	31.00 to 32.00
Old iron rails	26.50 to 27.00
Old car wheels	21.50 to 22.00
Choice scrap, R. R. No. 1 wrought	22.00 to 22.50
No. 1 yard scrap	19.50 to 20.00
Machinery scrap	21.00 to 21.50
Low phosphorus scrap	23.00 to 23.50
Wrought iron pipe	16.00 to 16.50
No. 1 forge fire scrap	16.25 to 16.75
No. 2 forge fire scrap, ordinary	12.00 to 12.50
Wrought turnings	16.00 to 16.50
Axle turnings, heavy	16.50 to 17.00
Cast borings	13.00 to 13.50
Stove Plates	16.75 to 17.25

NEW YORK.

Pig Iron Market Fairly Active.—More Foregn Iron Coming.

Office of THE IRON TRADE REVIEW. }
ROOM 1315, No. 150 NASSAU ST., Jan 22 }

Pig Iron.—The market of the past week has been one of only moderate activity, with a considerable selling of iron for early delivery to offset slightly less active conditions in that for last half shipment. The strength of the local market apparently is largely due to brisk buying in the west during the past fortnight, which has had the effect of bringing into the market a number of consumers who had been holding off and thus furnished the bulk of the recent business in this district. There has been a fairly extensive demand for prompt iron, with numerous contracts for small tonnages, and the week has also seen a recurrence of buying for the second quarter on the part of consumers who have found that the new year failed to bring with it easier conditions and who evidently feared difficulty in filling their requirements through the spring. On the other hand, the week has been unique in that one selling agency has received two requests for deferring of shipments until accumulated stocks can be reduced. This may mean nothing more than carelessness in shipping, resulting in lack of proper distribution of furnace output, yet it is the first instance of the kind which has come to light for a long time. Additional vessels are being chartered for the carrying of English and Scotch iron, in some instances for use late in February. The next week or ten days will see the landing of about 15,000 tons at north Atlantic ports. Prices manifest little change, though ranging between rather wide limits. Sales of southern No. 2 are still being made at $18.50 with some producers holding at fifty cents higher for the second half. We quote tidewater prices, last half delivery, as follows:

Northern Foundry No. 1	$ 26.00
No. 2 Foundry	23.50 to 25.50
No. 2 Plain	23.00 to 25.00
No. 1 Southern Foundry	23.50 to 26.00
No. 2 Southern Foundry	23.00 to 25.50
No. 3 Southern Foundry	22.00 to 24.00
No. 4 Southern Foundry	21.50 to 23.00

Finished Materials. — Activity in structural materials, which diminished to a considerable extent during the holiday season, gives strong indication of resuming its normal condition in the near future. The volume of prospective business is heavy, several good sized tonnages being on the market for award at a near date. The heaviest of these is a 15,000 ton building proposition shortly to be let in Chicago, while three local structures will each call for 2,000 or 2,500 tons. The American Bridge Co. has closed with the St. Paul railroad for about 6,600 tons of materials for bridge construction. New business in plates is light, though specifications are good. Bar iron in this district is firm, one interest reporting sales during the week of 2,000 tons. The price ranges from 1.70c to 1.80c, Pittsburg, the latter being the quotation of the principal producer. There is some activity in forging billets and eastern mills are shipping as far west as Cleveland.

The following are prices at tidewater: Angles 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.94½c; flange, 1.94½c; marine boiler, 2.41½c; refined iron bars, 1.84½c to 1.89½c; soft steel bars, 1.74½c to 1.84½c; sheets, No. 28 black, 2.60c.

Old Materials.—The market is noticeably easier and less active, with declines in almost all lines. Mills are buying sparingly, and this fact, together with the extremely mild winter up to date, has robbed the local situation of its strength. Cast scrap is fairly strong. We quote, tidewater prices, as follows:

Old iron rails	$24.50 to 25.50
Old steel rails, long lengths	21.00 to 21.50
Old steel rails, short pieces	18.50 to 19.00
Relaying rails	27.00 to 30.00
Old car wheels	22.00 to 22.50
Old iron car axles	28.50 to 29.50
Old steel car axles	21.00 to 21.50
Heavy melting steel scrap	18.00 to 18.50
No. 1 railroad wrought scrap	19.50 to 20.00
Iron track scrap	18.00 to 18.50
Wrought pipe	16.00 to 16.50
Cast borings	11.50 to 12.00
Wrought turnings	15.00 to 15.50
Heavy Cast Scrap	18.50 to 19.00

BUFFALO.

Furnaces Sold Well into the Last Half.—Market is Strong.

January 22.

Pig Iron.—Practically all the output of several furnaces for the year has been bought up, a most unusual condition in the Buffalo market for this time of the year. The strength of the market has continued even longer than furnace men expected, the rush of the early winter being followed by a sufficient activity among consumers to clean up much of the year's output. There will be scattering purchases, doubtless, and some big sales, before the market is entirely bought up, but it is confidently predicted that within a very few weeks there will be no more iron for sale for third and fourth quarter delivery. The little selling now going on is for fourth quarter.

Prices are firm and market is strong. No. 2 Plain Foundry is in demand and sales are being made mostly at $23, the price on the various grades of this iron ranging from $23 to $23.50. There has also been a change the past week in malleable Bessemer prices, which are now generally quoted at $23.50 and $24. This is a strong advance over $23 and $23.50 at which this grade has stood for several weeks. For malleable Bessemer there is a very strong demand, and had there been any offered early this week, $24 and $25 would readily have been paid for prompt delivery. Buyers, notwithstanding their willingness to pay a stiff price, could not secure the iron, as none could be had at the furnaces.

The opinion prevails that prices will continue firm for some time, perhaps indefinitely, as the demand from consumers has been greater than was anticipated. The condition of the market is the cause of much speculative talk, and it is generally believed that the market has settled down into a quiet condition, subsiding from the spurt of the earlier part of the season, and that prices will not fluctuate very much for some time. There is now no indication of a downward tendency in the market. Buyers are making contracts with a view to caring for their future business, and in many cases try to get a part of the contract filled for prompt delivery. Prompt iron being practically out of the market, buyers have been obliged to contract for future delivery only. For the last half delivery, we quote as follows:

No. 2 Plain Foundry	$23.00 to 23.50
No. X Foundry	22.50 to 23.00
No. 3 Foundry	22.00 to 23.50
Malleable Bessemer	23.50 to 24.00
Gray Forge	21.50 to 22.00
Charcoal	27.00 to 28.00

ST. LOUIS.

Large Inquiry for Pig Iron from Leading Car Interest.—Small Buyers Ordering.

January 21.

Pig Iron.—Considerable iron has been placed under contract in the last week for third quarter and last half delivery, though tonnages in individual cases have not been of the "heavy weight" class. The orders generally run from 100 to 1,000 ton lots, but the aggregate shows that the melters in this district have begun to "take hold" of the market. The large melters are protected for the present and can be relied upon to come in when they need the iron, but the advance buying by the smaller consumers is the really encouraging feature of the day. In the aggregate they buy most of the iron in this territory and when they are willing to venture ahead on the present schedule, it is almost a guarantee of the market's stability.

Some good inquiries are pending. The leading car interest is in the market for 30,000 tons for the last half, divided into 10,000 tons of Bessemer, 10,000 tons of southern foundry and 10,000 tons of charcoal. This same concern bought 750 tons of southern for immediate consumption. Another car company is also feeling the market and will soon place its order.

In the last few days a central Illinois melter bought 1,000 tons of southern for last half.

Iron quotations for first quarter, including the present rate of $3.50 from Birmingham to East St. Louis, range as follows:

Southern No. 1	$26.50 to 27.00
Southern No. 2	26.00 to 26.50
Southern No. 3	25.00 to 26.00
Southern No. 4	24.00 to 25.00
Gray Forge	23.50 to 24.00

Metal Market

NEW YORK.

January 22.

Pig Tin.—Metal for prompt delivery is in prompt demand, the price in this district being 41¾c to 42c. Activity in those lines in which pig tin enters largely is undiminished. London closed Monday at £191 for spot and £192 for futures.

Copper.—Producers are largely out of the market and are refusing prices for delivery later than May 1, the result being that copper and brass working concerns are declining to accept business for that period. No May electrolytic is to be purchased under 25c, and the supply at that figure is extremely limited, so much so that certain interests are offering May delivery at 25¼c. There is heavy buying of electrolytic abroad. Small lots are selling as high as 25½c spot in this market, with higher prices prevailing in Europe. Lake copper in small lots is quoted at 26c for early shipment and 24⅝c for April and May. The export movement since Jan. 1 has totalled slightly less than 11,000 tons.

Pig Lead.—There is an insistent demand for immediate requirements, with only a limited supply and increasing gains in consumption over production. Spot is quoted at 6.25c with jobbing prices slightly higher. Soft Missouri brands are held at 6.10c spot with special brands at 6.12½c. For soft Spanish lead £19 15s is asked in the British market.

Spelter.—Offerings are light, with spot bringing 6.75c. For western brands the spot quotation is 6.62½c, while for delivery within the next few weeks the market is about two points lower. The London market is £26 15s, an advance of 5s.

Antimony.—Cookson's metal is held at 25c to 25½c, Hallett's at 24c to 24½c, and ordinary brands at 23¼c to 23¾c.

CHICAGO.

January 22.

Copper is without appreciable change in price, casting being quoted at 26¾c and lake, 27c, Chicago, carload lots. Pig tin is stronger, and is now selling at 44½c. Lead is unchanged, desilverized being quoted at 6.50c to 6.60c for 50-ton lots, and corroding, at 7.25c to 7.35c for 50-ton lots. Carload lots are 2¼c per 100 pounds higher. Spelter continues in good demand, and is firm at 6.98½c. Sheet zinc is also firm at 8.40c La Salle in car lots of 600-pound casks. Antimony is without change at 28½c for Cookson's, and 26½c for other grades.

Old metals have advanced in sympathy with the higher prices on the new product. We have revised our quotations, and quote dealers' buying prices, as follows: Copper wire, 21c; heavy copper, 20½c; copper bottoms, 19¾c; copper clips, 20c; red brass, 19¾c; red brass borings, 16½c; yellow brass 16¼c; yellow brass borings, 14½c; light brass, 13c; lead pipe, 5.50c; tea lead, 5c; zinc, 5c; pewter No. 1, 28c; tin foil, 34c; block tin pipe, 27¾c.

The annual banquet of the New England Iron & Hardware Association was held at Hotel Vendome, Boston, Jan. 15.

THE IRON TRADE REVIEW

Devoted to Iron and Steel Manufacture and to the Machinery, Metal-Working and Foundry Trades.

PUBLISHED EVERY THURSDAY BY
THE PENTON PUBLISHING CO.
CLEVELAND

BOSTON
CHICAGO
CINCINNATI
DULUTH
NEW YORK
PHILADELPHIA
PITTSBURG
BIRMINGHAM, ENG.

Subscription, $3.00 per annum. To Foreign Countries, $4.50. Advertising Rates Furnished on Application.

Change of advertising copy must reach this office ten days preceding date of publication.

The Cleveland News Co., will supply THE IRON TRADE REVIEW through the regular channels of the American News Co.

European Agents: The International News Company, Breams Building, Chancery Lane, London, E. C., England.

ENTERED AT THE POST OFFICE AT CLEVELAND, AS SECOND CLASS MATTER.

PRINTED IN AN OPEN SHOP

January 24, 1907.

VIGOROUS PROTEST IS JUSTIFIED.

It is extremely difficult to determine by just what line of reasoning the traffic managers of the various trunk lines engaged in the iron carrying trade to the north have arrived at the decision that there is any measure of justice in their stand on the iron tariff advance which becomes effective Feb. 1. Ever since the publication of the higher schedules there has been wide interest as to what would be the ruling in the case of iron long sold but not delivered through the failure of southern lines to provide anything approaching ample transportation facilities. In view of the prices at which iron is now selling, little opposition was manifested by the trade to the twenty-five cent advance to apply on sales made after its announcement or on earlier sales on which delivery after that date was specified. Though the new rates will be as high as the industry has witnessed, iron producers generally have recognized the right of the railways to secure their due share of present-day prosperity and have offered little objection.

The startling feature of the railway program is the ruling, now being quietly announced, that the advance is to affect all iron shipments after Feb. 1. The transportation lines accordingly are to gather in the additional twenty-five cents not only on every ton now sold for later delivery or yet to be sold, but on every ton of the great accumulations in southern furnace yards as well. In the Birmingham district alone there is in the neighborhood of 65,000 tons in this last named class. The ruling means that, in addition to losses involved through non-delivery weeks and months ago of iron bought in good faith and counted upon, the consumer must now receive it whenever an impaired railway service can land it in his yard and must consume it in the manufacture of finished products contracted for on the basis of the lower freight tariff prevailing at the time at which he specified delivery.

No one acquainted with traffic conditions in the south would countenance the suggestion that possibly the prospect of a coming advance in freights might have had something to do with increasing iron accumulations in southern furnace yards. The difficulties which a record volume of business has forced upon the poorly-equipped southern lines during the fall and winter have been recognized and appreciated. Producing interests have co-operated, whenever possible, to relieve or diminish their distress, all of which increases the extent of the present injustice. The only offering in the way of justification is the opinion ventured by the railway traffic men that a double rate, one for iron honestly sold for delivery later than Feb. 1 and another for iron long sold and overdue, would not be permitted by the Interstate Commerce Commission. This article has not to deal with the possible holdings of that tribunal; if it should decide as the traffic men indicate, the only effect would be to alter the placing of the responsibility for a complete travesty on justice. And at any rate, appreciation for what iron and steel interests have done in affording them relief would seemingly dictate that the railways at least should make a test of the case and not anticipate a decision of the commission as settling the question finally.

AMERICAN AND BRITISH EXPORT TRADE.

A fortnight ago, approximate figures were given of the iron and steel exports of the United States in 1906, compared with the returns for the two previous years. It appeared that our exports in 1906 amounted to 1,353,900 gross tons, covering all products of which the tonnage is returned The total showed a fair increase over the two previous years. The figures look large, but are small compared with the export business of Great Britain, the 1906 statistics of which country have become available within the past week.

It will pay the American iron trade to study this situation closely. An impression has been nursed that, the United States having built up some export trade in good times the nucleus will be of the utmost value the next time a depression in domestic demand is encountered. There is call for judgment as to whether this can be done; whether the trade thus far secured, when it has not been seriously needed, is a true index of what can be done when the need for large exports becomes more important. While the United States has been prosperous, the two other great iron countries, the United Kingdom and Germany, have also been prosperous. They could readily spare the meager portion of the trade which the United States has taken. No serious depression can strike one country by itself. When the United States desires to increase its exports, will not these other countries be equally anxious to take the business? These are questions which interest members of the American iron trade, whether or not they are themselves exporters.

An effort has been made in the accompanying table to group the British exports, as far as feasible, along lines similar to those upon which the customary American export tables are constructed, and some direct comparisons are possible. Our exports of pig iron are negligible, not running into six figures, while British pig iron exports in 1906 ran into seven figures Our crude steel exports, on the other hand, run into six figures, while the British exports barely attain the dignity of five. British rail exports are very heavy, ours being lighter, although our total production is several

times that of the British. In wire and nails we are far ahead; in most other lines we are far behind, particularly so in sheets and tin plates, where the British have a great advantage in the matter of wages.

The items which in the appended table are grouped as "miscellaneous" find scarcely any counterpart in the American statistics, partly because they cover lines which we export, but do not have returned as to tonnage, and partly because they cover lines in which we have little export trade. There are included, among other items, the following: Cast iron manufactures, armor plate, bedsteads (18,327 tons in 1906), bolts and nuts, railway wheels and axles, anchors, etc.

British Iron and Steel Exports, Gross Tons.

	1905.	1906.
Scrap	149,060	177,704
Pig iron	982,876	1,664,442
Crude steel	8,594	11,736
Rails	546,569	463,240
Chairs and sleepers	78,700	73,363
Other railroad	80,493	80,489
Structural material	63,965	107,382
Plates, ⅛ and over	147,675	200,118
Plates, under ⅛	56,893	74,940
Pipe and fillings	218,502	295,302
Galv. and cor. sheets	406,815	443,131
Black plates	68,839	65,698
Tin plates	354,864	375,414
Hoops, etc	41,980	45,310
Steel bars	151,879	198,948
Wrought bars	143,309	151,052
Wire	81,261	95,119
Nails, screws, rivets	24,647	29,460
Miscellaneous	261,446	321,147
Totals	3,868,367	4,873,996

VALUE OF RIVER IMPROVEMENTS.

The great reduction in the cost of handling iron ore in recent years, due to the introduction of modern machinery, has an important bearing on the value of river and harbor improvements of a number of large cities of the country. Under the chairmanship of Congressman Burton, the river and harbor committee of the house of representatives has insisted that when the federal government undertakes an important harbor improvement, the municipal government of the city whose harbor is to be improved must do its share. For example; more than $5,000,000 has been spent by the national government on the Cleveland harbor, of which more than $4,000,000 has been expended since 1875, and $3,430,000 will be required to complete contemplated improvements to the outer harbor. Less than $2,000,000 has been spent by the city for the improvement of the Cuyahoga river, which winds its tortuous course through about ten miles of the city, affording locations for a large number of industries already, which number might be greatly increased by the expenditure of money by the city in dredging and straightening the river, now navigable for only about five miles of its course.

That the position of Mr. Burton's committee is sound has been shown in a striking manner by David T. Croxton, president of the Cleveland Furnace Co. He shows that the value of ore which is consumed in Cleveland is vastly greater to the people of the city than is the mere handling of ore which passes through the city to distant furnaces. He estimates that the ore consumed in Cleveland is worth in actual money to the city eight and one-half times that expended on the ore handled on the lake front, when it is shipped to other points, and that the investment in furnace properties alone is at least eight times that of the investment for shipping ore. It seems to us that Mr. Croxton is conservative and that he would have been safe in saying that the expenditure in manufacturing a ton of pig iron consumed in the city is ten times that of the cost of handling a ton which merely passes through the city. Mr. Croxton states that the ore can be moved from boat to car for 15 cents a ton, but the actual figures are certainly considerably less than that. Whatever the actual figures may be, it is perfectly clear that it is wise for the city having a river like the Cuyahoga in Cleveland, or the Chicago in Chicago, to utilize the waterway to the full extent. In the operation of a blast furnace, the city receives not only the direct benefits accruing from wages paid the laboring men employed at the furnace, but it also encourages the establishment of foundry and other iron working industries. In the case of the Cuyahoga river, several miles of its course can be made navigable, and doubtless other cities could make similar improvements, if they would only do their part and not look to the national government to do everything. In adhering to his policy, Mr. Burton can well point to the arguments made by Mr. Croxton and others showing that cities having rivers which can be made navigable within their limits have the strongest possible selfish reasons for supplementing the work of the national government.

CINCINNATI INDUSTRIAL BUREAU DINNER.

The annual dinner and meeting of the Cincinnati Industrial Bureau was held at the Business Men's club Jan. 21. William Lodge, of the Lodge & Shipley Machine Tool Co., presided. The object of the bureau briefly stated is to secure the location of industries in Cincinnati, by assisting in finding sites for either new plants or plants contemplating moving. The report of the secretary brought out the fact that the past year has been one of such great prosperity that but few plants have had time to consider moves and under the pressure of active business were content to remain where they were.

Mr. Lodge in his address made the suggestion that the membership of the bureau should form a syndicate to purchase a cheap tract of ground, suitable for factory building, for the purpose of being in readiness to offer factory property to persons or firms who might wish to come here. He also advocated the building of homes for working men in localities near some of the factory districts. He said the plants most wanted were those whose products were used all over the world, as such a plant could grow to immense proportions. He also dwelt on the labor problems, and referred to some efforts that had been made by the bureau to attract to this city a part of the immigration daily arriving in this country.

M. E. Ingalls, chairman of the board of directors of the Big Four railroad system, made an address appealing for a park system and abatement of the smoke nuisance.

William H. Manss, of Chicago, industrial agent of the C. B. & Q. R. R., made an interesting address on the value of exploitation, and the advantage of creating a sentiment in favor of a locality or firm.

Professor John Uri Lloyd spoke on "Cincinnati in Retrospect and Prospect," prophesying great industrial advancement and growth.

SEVERE CRITICISM

Of the American Federation of Labor by Commissioner Briggs.—A Successful Banquet.

(Special Correspondence.)

Milwaukee, Wis., Jan. 21.—What is considered by members of the Milwaukee Metal Trades' and Founders' Association to have been one of the most profitable meetings ever held under its direction took place at the Plankinton house on the evening of Jan. 18, following the annual election of officers. There was a large attendance, as a great deal of interest had been awakened by the topics and speakers advertised. Charles E. Sammond, the retiring president, spoke of "The Year's Work;" William George Bruce, secretary of the Merchants' and Manufacturers' Association, of "Character in Commerce;" A. J. Lindemann, of "Industrial Education;" Richard B. Watrous, secretary of the Citizens' Business League, of "A Bright Spot (Milwaukee);" O. P. Briggs, president of the National Founders' Association, of "Lessons of 1906," and W. H. Winslow, vice president of the Chicago Foundrymen's Association, brought "Greetings From Chicago."

The addresses followed a banquet, the principal speaker being Mr. Briggs who remarked that no city in the country had been so greatly affected by the strike of the molders as had Milwaukee, and that in no city had a more intelligent and effective stand been taken by the employers. He complimented the Milwaukee association for the harmony and co-operation that had been maintained, and said that as a matter of fact the Foundrymen's Association was maintained to obtain peace, and was not responsible for the strike. He said there was great need of educating the public regarding the difference between good unions and bad unions, the tendency at present among the public being simply to draw a line of demarkation between the union and non-union.

Mr. Briggs criticised the officers of the American Federation of Labor, an organization which he declared awakened an unwarranted fear among many persons, when as a matter of fact it had among its membership but 6 per cent of the workers of the country. He said fully 75 per cent of the laboring men meant to be fair with their employers, and that it was this 75 per cent with whom the employers should most concern themselves.

Mr. Briggs expressed the belief that if the facts with relation to the private conduct of some leaders of the Federation at Minneapolis during the last convention of that organization were made known, their power would be broken. Mr. Briggs reviewed the molders' strike at length.

Ex-President Sammond of the Milwaukee Founders' organization, said that the Milwaukee shops were full of molders, and that the members do not in the least regret the stand they have taken towards their employes. He believed that if they had not done as they have, there would have been difficulties with the machinists and pat-

GEN. OTTO H. FALK.

ternmakers to occupy their attention.

"The men who are out of work are so from choice," said Mr. Sammond. "Foolish prejudices that favor the weak have placed the employers in a false light with the public. The hysterical attacks on capital today, moreover, are working more harm than good. We stand for peace, and one of the things that make for peace is the ability to strike a knockout blow when necessary."

Mr. Lindemann spoke of the new trades' school which has been established in Milwaukee, and which is proving its need. Mr. Briggs in the course of his remarks took occasion to also praise this school and the educational work it is doing, a work that tends, he said to produce young men who will rely upon their merit and ability to obtain good wages, and not upon the machinations of unions.

Gen. Otto Falk was elected president of the Milwaukee association. He is a veteran of the Spanish-American war, in which he made a splendid record for organization and executive ability. He is vice president of the Falk Co., one of the most successful iron producing concerns in the northwest. S. L. G. Knox, of the Bucyrus Co., of South Milwaukee was elected vice president, Henry Froelich, of the Speich Stove Repair Co., treasurer; F. M. Prescott, of the Prescott Steam Pump Co., director of the founders' section, and Henry Harnischfeger, of the Pawling & Harnischfeger Co., crane makers, director of the machinists' section. W. J. Fairbairn will probably be again selected by the directors as secretary.

ADVANCE IN FREIGHT.

The 25 cents a ton advance on pig iron rates from southern furnaces to points north, east and west announced recently, will go into effect Feb. 1. The new scale per gross ton from Birmingham to various representative shipping points in different sections of the country is as follows:

Boston, Mass., all rail, $6.40; Boston, Mass., rail and water, $4.60; Chicago, Ill., $4.34; Cincinnati, O., $3.25; Cleveland, O., $4.35; Columbus, O., $3.95; Detroit, Mich., $4.50; E. St. Louis, Ill., $3.75; New York, N. Y., rail and water not including lighterage, $4.25; New York, N. Y., all rail, $5.95; Philadelphia, Pa., rail and water, $4.00; Philadelphia, Pa., all rail, $4.75; Pittsburg, Pa., $4.85; Youngstown, O., $4.45.

Provision is made for the customary differentials for furnaces north of the Birmingham district.

Harvester Earnings.—President Cyrus H. McCormick, of the International Harvester Co., has made a statement to the stockholders in connection with the classification of the capital stock, giving the net earnings of the company for the last four years, excluding all reserves for depreciation, etc., which aggregated $4,500,000, as follows: 1903, $5,641,181; 1904, $5,709,712; 1905, $7,501,585; 1906, $8,622,446, total for the four years, $27,474,924. Of these earnings $18,000,000 have been applied to the payment of dividends, at the rate of three per cent for the first year and four per cent for the succeeding years. The balance of the earnings, amounting to $9,474,923, has been carried to surplus and expended in enlarging the facilities of the company.

PLANTS DAMAGED.

Fire, Flood and Storm are Responsible For a Number of Losses.

The severe snow storm and gale which swept over Cleveland Jan. 20 caused damage to several plants in that city. A side building of the Interstate Foundry Co. was unroofed and the roof hurled completely across the street. Though the building had been used for the storage of patterns, there was none in it at the time, the management states, and the reports in the daily press that heavy damage was caused to the patterns by the falling beams is denied. The loss is reported to be small. At the wire mill of the American Steel & Wire Co., at Newburg, three large steel stacks 150 feet high were blown over upon the boiler house and warehouse. These buildings were considerably damaged, but by two boilers which escaped injury, the company was enabled to keep up steam and hopes to resume operations after several days' lay-off. The loss will amount to several thousand dollars.

Fire completely destroyed the plant of the Hill & Griffith Co., manufacturer of foundry supplies and almost totally consumed the stove foundry of William Resor & Co., at Cincinnati, Jan. 20, entailing a loss estimated at $375,000, partially covered by insurance. The origin of the fire is a mystery. The foundry of Resor & Co., was established in 1819 and is regarded as the oldest of its kind west of the Allegheny mountains.

The plant of the South Atlantic Car & Mfg. Co., located three miles southwest of Savannah, Ga., was destroyed by fire Jan. 17, the loss of $300,000 entailed being partly covered by insurance. Twenty car loads of materials and a large number of partially completed box cars were burned.

The Pullman Co.'s repair plant, at Wilmington, Del., was damaged by fire to the extent of $500,000, Jan. 19. Forty-five newly finished cars and one of the largest buildings of the plant were consumed. The blaze is supposed to have started from spontaneous combustion.

Cincinnati plants located along and near the Ohio have been battling a flood during the past week that had threatened to engulf them. A number of concerns were flooded by the high waters and considerable damage was suffered to equipment and buildings.

The city of Scranton, Pa., will probably rebuild five bridges. Three have been condemned by the grand jury.

LATE NEW YORK NEWS.

Late rail sales include the following: Coeur D'Alene & Spokane, 6,000 tons; East St. Louis and Suburban, 1,500 tons, Norfolk & Western 1,500 tons; Washington, Baltimore and Annapolis Electric Ry., 2,000 tons; Atlantic Shore Line, 1,000 tons; Steubenville and East Liverpool, 3,000 tons; Boston and Northern Street Ry., 2,000 tons, miscellaneous 3,000 tons. In addition the Cannanea Consolidated Copper Co. railway system has purchased 2,000 tons for use in Mexico.

There has been considerable selling of foundry iron during the past two days, on the strength of which certain prominent eastern producers have advanced prices for that delivery fifty cents per ton.

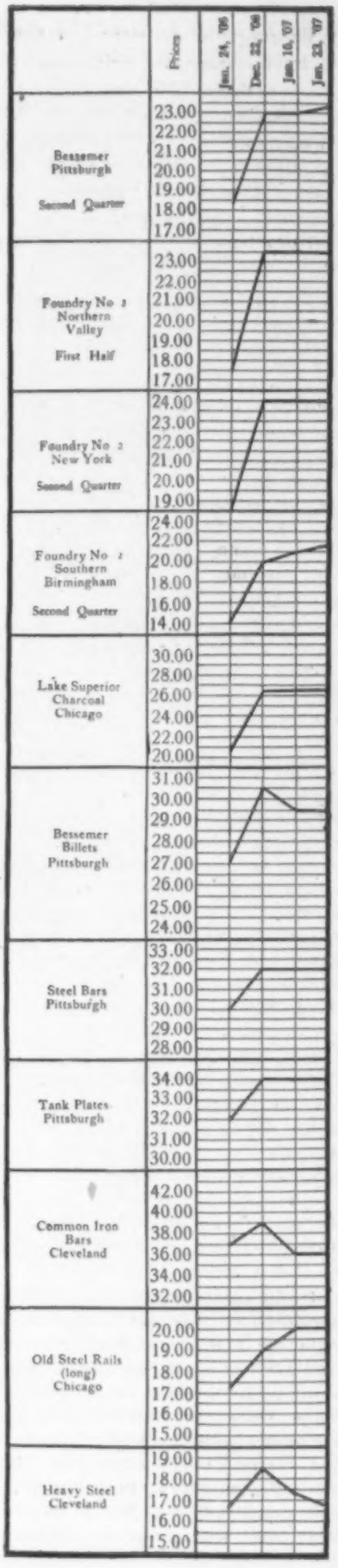
DEATH OF R. C. FAULCONER.

R. C. Faulconer, one of the best known business men of Detroit, died from paralysis at New Bedford, Mass., Jan. 18, at the age of 62. He was born in England and after coming to this country entered the railroad business, later becoming purchasing agent of the Detroit and Milwaukee railway at Detroit, succeeding the late Senator James McMillan. Taking up the lumber business he built up the Mason Lumber Co., of Alpena and then organized the Leland & Faulconer Mfg. Co., foundrymen, of Detroit, of which he took charge and conducted with success. Failing health caused Mr. Faulconer's retirement from active business in 1901.

Visited New Steel Plant.—The new steel plant of Milliken Bros., on Staten Island, was visited on Thursday of last week by some seven hundred members of the American Society of Civil Engineers. The party was taken to the new works by a boat and the entire afternoon was given over to an inspection of the plant, officials and employes of the company serving as guides and explaining the many novel features incorporated in the plant. This is one of the annual excursions of the society.

The Exposition of Safety Devices and Industrial Hygiene is to open Jan. 29 at the American Museum of Natural History, New York. A permanent museum of safety devices is aimed at. The opening of the exhibit will be preceded by a banquet on the evening of Jan. 28 at the Waldorf-Astoria, at which a number of personages prominent in industrial welfare work in this country and abroad will be present.

PRICE CHART.



MANY FINE EXHIBITS

MADE BY IRON AND STEEL MANUFACTURERS

At the Automobile Show in New York.—Special Grades of Steel.—Pressed Frames. — Bolts, Screws and Other Equipment.

(Special Correspondence.)

New York, Jan. 21.—The extent to which the iron and steel manufacturing industry as well as the machine industry is connected with the production of automobiles was strikingly illustrated in the exhibits of accessories at the New York show of the Association of Licensed Automobile Manufacturers, held at the Madison Square Garden all of last week. Among those manufacturing concerns represented by exhibitions in the splendidly decorated booths and sections of the great hall were many which are prominent figures in the production of iron, steel and finished products. Their exhibits were uniformly unique and of interest to the visitor.

Fifteen special grades of steel made by the Bethlehem Steel Co. were shown, together with a complete line of tool steel, drop forgings of carbon and alloy steel, axle forgings made solid in one piece without weld, crank shafts and a miscellaneous assortment of drop forged gear blanks, axles, crank shafts, etc. A feature of the exhibit was a vibratory testing machine, in constant operation to show the method of measuring the life of metal under alternating stress.

The Shelby Steel Tube Co., in its section exhibited seamless steel cylinders for gasoline engines, steel lubricating tubing of small diameter offered as a substitute for copper, providing greater strength and equal ductility, wrist pins and a wide assortment of tubing for other uses.

The Carpenter Steel Co., Reading, Pa., devoted its space largely to a showing of nickel and chrome steel, presenting also a large number of cold bending tests. A steel chip forty feet long, turned from a gun barrel made for the government, together with the tool used in making the cut was on view as a wall decoration.

The American & British Mfg. Co., Bridgeport, Conn., exhibited various types of pressed steel frames, sides and cross members for automobiles, made from nickel, carbon and special alloy steel. Pressed steel parts for field artillery made for the government, drop forgings for automobile uses and sheets of carbon and nickel steel also attracted much attention.

The Cleveland Cap Screw Co., Cleveland, was represented by a complete line of finished steel bolts and screws of large size, all with the bolt heads electrically welded, valves made from a variety of steels, propeller shafts, axles, etc.

S. F. Bowser & Co., Ft. Wayne, Ind., manufacturing oil tanks, demonstrated the Bowser tank system which is as well suited for the automobile and the auto shop as for the machine shop.

The Baldwin Chain & Mfg. Co., Worcester, Mass., showed its full line of chains of all sizes as well as its improved Baldwin spring recoil check.

Gear exhibits were a feature of the show, the Brown-Lipe Gear Co., Syracuse, N. Y., being represented by sliding gear sets in both progressive and selective types, differentials, steering wheels, etc.

Cramp & Sons, Philadelphia, had an exhibit of brass and bronze castings. The Light Mfg. & Fdy. Co., Pottstown, Pa., showed a line of aluminum, manganese bronze and bearing metal castings.

The Joseph Dixon Crucible Co., Jersey City, N. J., exhibited flake and powdered graphite, dry and in paste, and crucibles. An open gear case, showing how the gear should be packed and how it works, and a metal plate with a slide run without any lubricant whatever, the metal having graphite worked into it, attracted much attention.

The Diamond Chain & Mfg. Co., Indianapolis, showed a line of chrome nickel steel chains and built-up block chains. The Whitney Mfg. Co., Hartford, Conn., exhibited its driving chains, keys and cutters for the Woodruff system of keying, chucks and friction tapping devices.

The General Electric Co., Schenectady, N. Y., had on view its vehicle motors and storage battery charging panels, together with a mercury arc rectifier for use with the latter when only alternating currents are available.

Four large machines, intended for machine shop use in motor car factories, formed a prominent part of the exhibit of the Garvin Machine Co., New York. These included a 14-A milling machine with an electric motor incorporated in the base at one side and with the starting box carried well up on the other, a profiling machine, an automatic tapper and a duplex milling machine, all in full operation and showing the work they do.

Peter A. Frasse & Co., New York, showed a variety of drop forged crank shafts, axles and miscellaneous parts, steel tubing and forgings in chrome nickel alloys.

The Standard Welding Co., Cleveland, made a specialty of its electric welding of parts, showing an illustration of the welding of Tobin bronze. It also exhibited a line of straight and bent tubes, rims, flanges and a new tubular steel steering wheel.

Two small trucks, mounted on plain bearings and those manufactured by the Hyatt Roller Bearing Co., of Harrison, N. J., were on exhibition in the space of that company. They were equally loaded and moved on a surface plane, the test showing that the power required to start the load on the plain bearings was some 700 per cent greater than with the Hyatt bearings.

The Whitlock Coil Pipe Co., Hartford, Conn., showed a variety of radiators of different construction, with samples of accurate pipe bending work and a number of small auto parts.

The Manufacturers' Foundry Co., Waterbury, Conn., has an extensive exhibit of cylinder and other castings.

T. G. Meachem, vice president of the New Process Rawhide Co., Syracuse, N. Y., was a constant visitor at the motor car show. The output of this company has been tripled in the past two or three years by reason of the demand for its product in the automobile industry.

WILL OPERATE PLANT.

A meeting of unsecured creditors of the National Wire Corporation, New Haven, Conn., was held at the Astor House, New York, Jan. 17, in accordance with a call sent out over the signatures of H. Stuart Hotchkiss and Frederick B. Farnsworth, receivers, who explained that in order to keep the plant in operation as a going concern, as ordered by the court, they would have to be authorized to borrow money for the purchase of supplies, etc. The decision of the creditors was to place their interests in the hands of J. A. Jones, secretary of the Alan Wood Iron & Steel Co. and Messrs. Martin, of the Pennsylvania Steel Co., and Jaycox, of Ernst Law & Co., all of Philadelphia, these being three of the largest creditors. The conclusion was reached that the plant should be kept in operation and application will be made to the Superior court at New Haven for an order permitting of the borrowing of the necessary amount. It is stated that unless the holding company is admitted on the same basis as the regular creditors, the latter will probably get dollar for dollar.

ST. LOUIS PROSPERITY

Reflected in Its Building Boom.—Increased Capacity of Manufacturing Plants.

St. Louis steel men are divided as to whether St. Louis works can supply the demand for the local territory this year. It is realized that the demand this year will be even larger than it was last, but the local mills have made alterations and additions which will increase the output materially. Whether this increase will keep apace with the growing demand, is a question which only time can solve. It may be stated, however, that the mills are now behind on their orders. Some of the local works which consume all their own steel, such as the National Enameling & Stamping Co., in the production of such manufactured wares, will not be considered in this article. The local plants, with the tonnage of last year and the estimated tonnage for next year are as follows:

Works.	Tonnage per month last year.	Estimated Tonnage per month this year.
East St. Louis plant	3,500	3,500
American Steel Foundries		
Granite City plant	3,800	4,800
Commonwealth Steel Co.	2,400	3,000
Scullin & Gallagher	1,800	3,500
Totals	11,500	14,800

This is an increase of practically 40,000 for the year.

In the building line, probably no city in America is outstripping St. Louis today. A building boom, held back for many years, is on and skyscrapers are appearing almost like mushrooms. Ten office buildings, all above ten stories in height and some of then eighteen, were erected last year, while dozens of smaller structures appeared all over the city.

This record promises to be eclipsed this year. This year more moderate sized buildings will be erected. Six skyscrapers are practically settled upon, while several additions will be made to others and smaller buildings will go up everywhere, requiring thousands of tons of fabricated material. With only one mill, Christopher & Simpson, in St. Louis, turning out fabricated material, it will be seen that St. Louis will have to go out of its territory for practically all of this material, which will reach at least 75,000 tons.

St. Louis pig iron agents do not expect the tonnage this year in the southern district will increase to any appreciable extent, certainly not to keep apace with the growing demand. The Napier Iron Works at Napier, Tenn., made alterations which have increased its capacity approximately 500 tons a month. The Chattanooga furnace made alterations which increased its capacity 6,000 tons a month and the St. Louis Blast Furnace Co. increased its output about 200 tons a month. It is expected that many other furnaces will show a slightly larger output than last year, chiefly because, on account of labor and other troubles in 1906, they were hindered, but it may be safely stated that the production will not be larger than last year's by any great extent.

OUR ANNUAL CHART.

The annual chart published by THE IRON TRADE REVIEW, Jan. 17, showing the fluctuation in the prices of iron and steel products during the past 12 years, was sent to all subscribers. A few extra copies have been printed, and will be mailed on application in tubes to subscribers who desire to frame them. The chart is the same size as that of last year, and can easily be placed in the frame then used. The chart is a wax engraving in four colors, and gives the prices of the following products: Tank plates, Chicago; beams, Pittsburg; bar iron, Cleveland; Bessemer billets, Pittsburg; Bessemer pig iron, Pittsburg; No. 2 foundry, Chicago; gray forge, Cincinnati; No. 2 foundry, Birmingham.

Russian Ore Leases.—Consul Alexander Heingartner, reporting from Riga, states that an English company has leased manganese ore lands in the district of Tschiatury, in the Russian South Caucasian Government of Kutais, which district has at times supplied nine-tenths of the world's demand of this ore. Out of a total Russian production of 536,558 tons, there were mined 415,000 tons in the district in 1902. The land leased is reported to be about 50,000 dessiatines (134,985 acres) and will bring a yearly rental of $12,875. The branch line starting from the station on Kwirilly, on the Trans-caucasian railway, is being extended north-eastward at Satscheri and eastward to the village of Dschaba. A stock company, capitalized at 3,000,000 rubles ($1,545,000) has been organized.

OBITUARIES.

James A. Galbraith, aged 76, manufacturer of farm and grain machinery, died at his home in Canonsburg, Pa., recently.

John Quigley, at one time a manufacturer of cutlery and tools, died at his home at 72 State street, Newark, N. J., Jan. 15, from an attack of the grip at the age of 86.

Frederick A. Turnbull, secretary of the Viles & Scott Wheel Works, at La Porte, Ind., and generally known as an iron and steel expert, died from a complication of diseases Jan. 14. He was born in Newark, N. J., in 1849.

John Duncan, a pioneer lumberman and foundryman, died at his home in Green Bay, Wis., Jan. 9, at the age of 81. It is claimed for Mr. Duncan that he built in the city of Milwaukee a locomotive for the Chicago, Milwaukee & St. Paul Railroad Co., which was the first locomotive built in the state of Wisconsin. He is survived by three sons.

Oliver Bourne Green, well known in civil engineering and contracting circles as the builder of the Sturgeon Bay Ship Canal and other enterprises on the great lakes and adjacent waters, died at his home in Chicago, Dec. 30. As a dredging and general harbor contractor, he was connected with many of the developments of the Chicago river.

George R. Waite, a consulting engineer, died recently at his home in Philadelphia. Mr. Waite went to Philadelphia 25 years ago from his birthplace in Rhode Island. As a member of the staff of engineers selected to exploit Sir William Siemens' system of furnace construction in the United States, Mr. Waite gained prominence. He served for 18 years with the Siemens' interests, and his duties took him before expert bodies of engineers all over the country. His body was taken to Pittsburg for burial.

Ralph I. Gates, a pioneer in the cement business of the west and secretary of the Chicago Portland Cement Co., died at his home in Chicago, Jan. 16, aged. 64. He was identified for a while with the Eagle Mfg. Co., out of which grew the Gates Iron Works and the Fraser, Chalmers Co. His father, Philetus W. Gates, was one of the early iron manufacturers of the west. Mr. Gates left the Gates Iron Works in 1867 and organized the Anglo-American Portland Cement Co., the name of which was afterwards changed to the Portland Cement Co.

PERSONALS.

Julius Broehl has been elected president and general manager of the Pana Metal Co., Pana, Ill.

Charles Erickson recently resigned as secretary of the Aurora Automatic Machinery Co., Aurora, Ill.

J. C. Saner has been elected president of the Union Machine Co., Zanesville, O.; Edward Meyer, vice president, and J. R. Bowden, secretary and treasurer.

James H. Baker, formerly vice president and general manager of the Solid Steel Tool & Forge Co., of Brackenridge, Pa., has been elected president of the company.

W. M. Lewis, formerly in charge of the mills of the Colorado Fuel & Iron Co., Pueblo, Colo., will be superintendent of the new rolling mill soon to be put in operation at Linton, Ind.

Ambrose Swasey, of Warner & Swasey, Cleveland, has been elected first vice president of the National Board of Trade, which has just concluded its annual convention in Washington.

F. C. Irvine, sales manager for the American Rolling Mill Corporation, Chicago, has resigned. Mr. Irvine will engage in the brokerage business with headquarters at 1243 Marquette building.

Henry Stanley Haskins was elected a director and member of the executive committee, vice F. M. Cronise resigned, at the annual meeting of the Columbus & Hocking Coal & Iron Co., of Columbus, O.

Homer J. Lindsay, who has been confined to his home for some time by serious illness, is reported to be improving. He is assistant to A. C. Dinkey, president of the Carnegie Steel Co., of Pittsburg.

Festus J. Wade, president of the Mercantile Trust Co., has been elected to fill a vacancy in the board of directors of the Scullin-Gallagher Iron & Steel Co., St. Louis, Mo., to succeed F. N. Johnson, resigned.

Robert S. Bosworth, formerly connected with Rogers, Brown & Co., has purchased an interest in Hugh W. Adams & Son, Inc., pig iron commission merchants, New York, and is now secretary of the company.

William H. Lewis, retiring general manager of the Sharon plants of the Carnegie Steel Co., will be tendered a banquet by the heads of departments of the Carnegie Steel plants of Sharon and New Castle, Jan. 26.

Dr. John M. Davis, Darlington, Pa., has been selected general manager of the United States Furnace & Foundry Co., of that city, by the board of directors to succeed O. L. Badger, of Pittsburg, who recently resigned.

Elliot Knight, formerly of Birmingham Ala., has been appointed salesman for the Republic Iron & Steel Co. and the Tennessee Coal Iron & Railway Co., at Cincinnati, O., vice Jerome Keeley, who resigned effective January 1.

John Birkenbine, who after serving for ten years as president of the Franklin Institute, declined to become a candidate again, has been succeeded in that capacity by Walton Clark, third vice president of the United Gas Improvement Co., Philadelphia.

General Superintendent D. R. Mathias, of the Joliet, Ill., plant of the Illinois Steel Co., in company with two representatives of the Carnegie Steel Co., has gone for a two months' trip to Europe, where he will study various steel plants.

Joseph A. Doyle, of the Jones & Laughlin Steel Co., who will soon take up his new duties as chief clerk of the Alliquippa plant of that company, was tendered a banquet at the Monongahela house, in Pittsburg, Jan. 19 by the pay office employes.

Dr. G. J. Carter, president of the Champion Iron Co., Kenton, O., presided at a banquet recently given by the company at the Hotel Weaver, in that city, to the heads of departments and foremen to bring employer and employed in closer touch.

Michael H. Fallon has been elected president of the Reynolds-Chalou Foundry Co., Troy, N. Y. The other officers are: Joseph Mackey, vice president and secretary, and Frank M. Brady, treasurer. These officers also constitute the board of directors.

Alfred Fowle Jr. and J. B. Murphy have resigned as president and vice president, respectively, of the Central Foundry Co., New York. A. F. Gartz, for many years treasurer of the Crane Co., Chicago, has been elected president. The vice presidency has not yet been filled.

Spencer Kellogg, Sr., prominently identified with the New York State Steel Co., of Buffalo, N. Y., and numerous other interests, who was taken suddenly ill with appendicitis last week, and operated upon at the Buffalo General hospital, is fast recovering, and it is expected that he will soon be well again.

Edwin A. Moore has been elected president of the Wilbraham-Green Blower Co., of Philadelphia, Pa. The other officers of the company just selected are: Vice president and general manager, David T. Jones; secretary and treasurer, John S. Wilbraham, and chief engineer, Thomas W. Green.

O. E. Buckley, who has been assistant chief engineer of the drafting room of the Carnegie steel plant at Sharon, has resigned to accept the position as chief engineer of the new plant which the Jones & Laughlin Steel Co. is erecting at Aliquippa, Pa.

Archibald Craig, a mechanical engineer of the firm of A. F. Craig & Co., manufacturers of engines and boilers, of Paisley, Scotland, is visiting various American plants to study conditions and methods of work. Recently he inspected the Allis-Chalmers plant in Milwaukee, Wis.

S. D. Porter, general manager of the Acme Harvesting Machine Co., of Peoria, Ill., has tendered his resignation and will soon leave the company to look after his own business affairs in Ohio. P. P. Coaling, the present treasurer of the company is spoken of as his successor.

T. B. Walsh, who resigned the superintendency of the Frost Foundry, Galesburg, Ill., was recently presented a handsome combination Masonic and I. O. O. F. watch charm, set with a diamond solitaire, by members of the office force and employes of the plant. The presentation was made at Mr. Walsh's home where the employes assembled to surprise the former superintendent.

James Lord has been selected as vice president and general manager of the American Iron & Steel Mfg. Co., Lebanon, Pa., vice H. M. Sternbergh, who recently resigned. Mr. Sternbergh retains the presidency of the company. W. C. Freeman and Edward R. Coleman have also been selected to fill the offices of directors left vacant by the resignation of John R. Craven and C. M. Hallman.

Furnaces Begun.—Ground has been broken by the Carnegie Steel Co., at Youngstown, O., for the foundation of the group of 12 open-hearth furnaces of 50-ton capacity to be built at that plant. The mills and furnaces will be under the direct management of Thomas McDonald.

Upon the showing made by attorneys in behalf of creditors Judge Quarles, at Milwaukee, Wis., Jan. 14, declared the Eagle Horse Shoe Co. of that city an involuntary bankrupt. John C. Koch is president of the company and W. C. Koch, his son, is secretary and treasurer.

PLANT OF THE FERRACUTE MACHINE CO.

HOW A NEW JERSEY CONCERN WAS REBUILT AFTER A FIRE.

Interesting Features of a Plant Whose Product Includes Punch Presses of Many Designs.—A Shop that Cannot Burn.

By an Editorial Representative of The Iron Trade Review.

The original plant of the Ferracute Machine Co., Bridgeton, N. J., was totally destroyed by fire three years ago. The fire, occurring at a time when business was brisk, seriously interfered with the plans of the company and caused considerable inconvenience in filling the orders on the books, as well as preventing the acceptance of as much new work as could have been obtained. The officers of the company, before rebuilding, arranged that the construction of the new shops should be such that the business would never again be interrupted by fire. It was decided that the shops should be of fire proof construction in the fullest sense of that word, and that the combustible material in them should be reduced to an absolute minimum. This idea has been thoroughly carried out and practically the only combustible material to be found in the works today, aside from the office building, are the tops of the benches and the tool chests of the workmen. In the buildings themselves, not an iota of wood has been used.

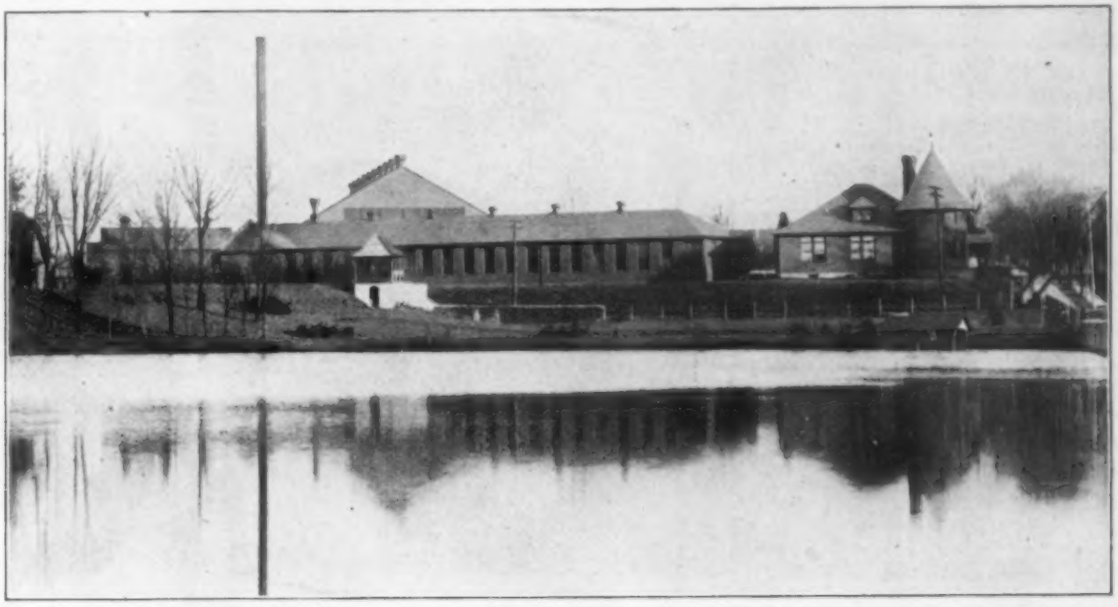


Fig. 1.—Exterior of Ferracute Machine Co. Plant, Bridgeton, N. J.

Building Construction.

The illustration, Fig. 1, is an exterior view of the plant. The building at the right, with the tower, is the office; the long low building immediately in the rear contains the carpenter and pattern shops, pattern storage and power plant. The low building at the rear of the power plant is the forge shop, while the gable of the machine shop projects above the roof of the power plant.

The product of the Ferracute Machine Co. consists of punch presses of all sizes and designs. The work ranges from the machining of very heavy castings and forgings down to extremely delicate operations; and the plant for doing this character of work must possess a varied assortment of accurate tools. Good light is also an essential to accurate work, and this is furnished by providing the walls, both side and end, liberally with windows and also by a large skylight let in the roof of the building.

The machine shop is of red brick, the dimensions at present being 200 x 100 feet. The rear wall is constructed of corrugated iron, so that it may be easily moved and the shop extended further when any increase in capacity is desired. The building is surmounted with a single peaked roof, the skylight heretofore mentioned extending its entire length and having a width of 38 feet. It is constructed of fire proof materials throughout; the roof is of red tile and glass, supported upon a steel frame work; the floors are of concrete, while the window frames and sashes are of metal.

The light is further improved and the fire risk diminished by the elimination of all belts in the shop. Every machine is provided with an individual motor, these being geared to the machines by a number of different methods as will be related below. The leads for the motors are carried in underground conduits with outlets at the various machines. The tools are kept scrupulously clean and the place presents a far different appearance than is usual in a heavy machine shop.

The building is divided into three bays by two lines of columns supporting the crane runways. The center bay is spanned by a 20-ton Niles and a 10-ton Pawling & Harnischfeger electric crane for handling the material being assembled into the completed machine. The side bays are each spanned by a five-ton Niles crane for transferring the heavier work to and from the various machine tools. The operator of the 20-ton crane rides in a cage suspended from it, while the five-ton cranes are controlled by a man

on the floor who operates suitable switches by suspended cords.

As is usual in shops constructing heavy work, the side bays are occupied by the lighter tools. The heavier tools are arranged along the edges of the central bay, while the middle portion of it is reserved for erecting. Portions of the side bays are divided off to form the store room, the tool room and the die room. The smaller lathes and lighter maximum of storage space, while occupying a minimum of room.

Tool and Die Rooms.

The tool room is directly across the shop from the store room and contains machinery for the making and facilities for the storage of the various tools used about the shop. Its equipment comprises two tool grinders, a drill grinder, several tool-makers' lathes, a radial drill, drill presses and a shaper. Appropriate cabi- cated in the side bay directly beyond the tool room, and contains a large number of tools used exclusively for making the dies used in connection with the various presses turned out by the rest of the shop. The machines in the die room comprise a planer, several shapers, slotters, vertical and horizontal milling machines, together with a number of lathes, drill presses, rotary grinders, grinding planers, etc. The dies when completed

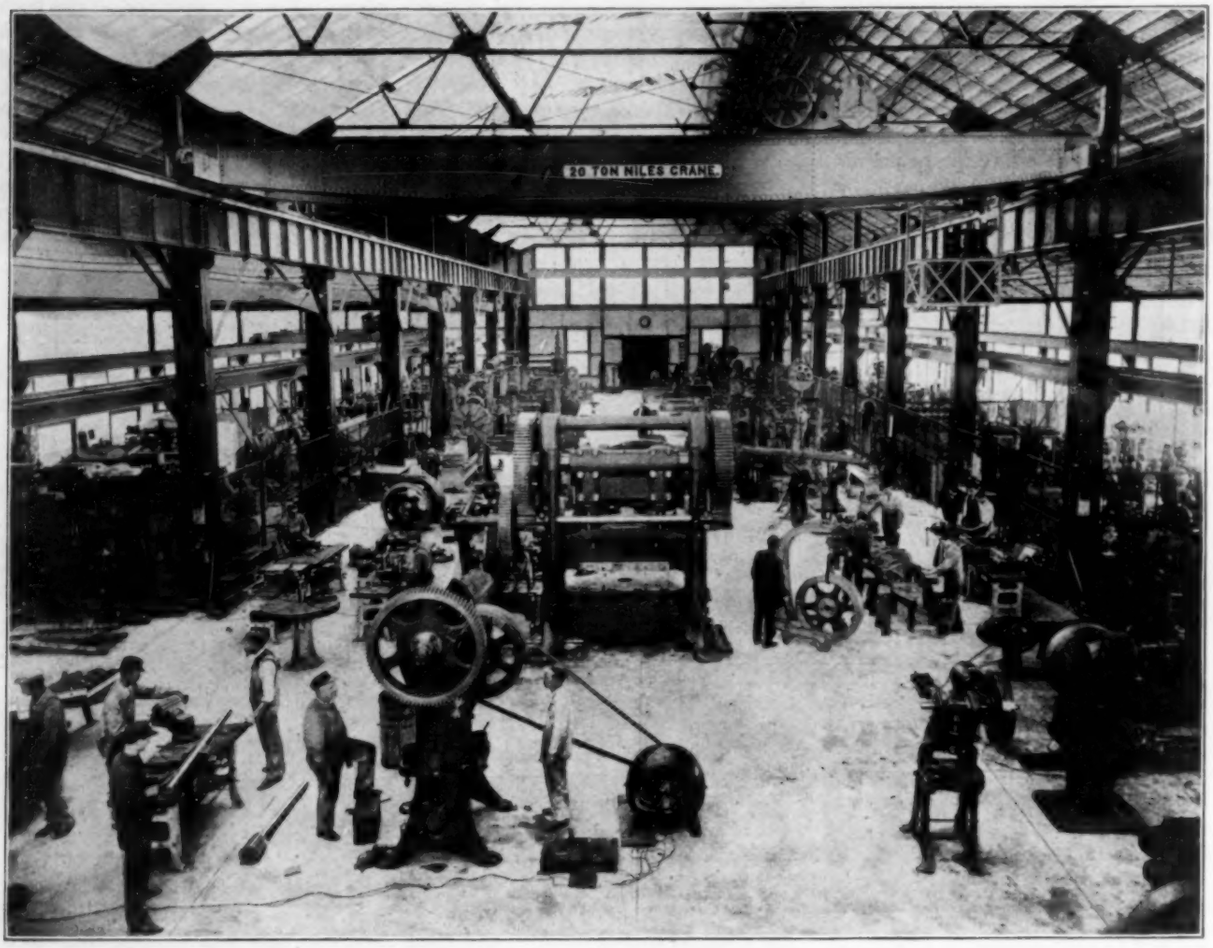


FIG. 2.—INTERIOR OF MACHINE SHOP, FERRACUTE MACHINE CO.

planing tools are grouped together at one end of the shop below the store room, which is shown in the illustration, Fig. 2 at the left. In this portion of the plant ten lathes are installed, arranged perpendicularly to the wall in order to economize room. There are also two turret lathes and a number of other tools, including shapers, universal, plain and vertical milling machines, and a number of drill presses. The store room contains the smaller standard parts, used in the construction of the presses, which are distributed as required upon the presentation of appropriate orders. These parts are stored in steel racks and bins, of such size and shape as to provide a nets and storage racks are provided for the tools, which are checked out to the men in accordance with the usual system. The long tools of small diameter, such as drills, reamers, taps, etc., are kept in a novel form of cabinet which utilizes every inch of storage space. This is formed of an angle-iron frame, in which are placed corrugated sheet metal strips forming a series of compartments occupying the full area of the rack, and providing storage space for a large number of tools. It is illustrated in the sketch, Fig. 3.

In a plant manufacturing presses, the die shop is always an important feature. In the plant under discussion, it is lo- are immediately taken to the main shop where they are fitted to the presses under erection.

Arrangement of Heavy Tools.

The central portion of the shop contains, as heretofore mentioned, all the heavier tools, the tools of any one kind being grouped as nearly as possible together. Four planers of varying sizes are thus arranged side by side at the lower end of the shop. Immediately adjoining them are four horizontal boring mills, one vertical mill and some drill presses. On the opposite side of the shop are two large grinding lathes and a number of radial drills, drill presses, and a large lathe which has been blocked

up to permit the swinging of larger pieces than it was ordinarily designed to handle. Next to this is a very long heavy lathe used especially for press shafts.

The gears used on the presses are all cut from the solid, this work being done in a pair of automatic gear cutters located on the edge of the central bay just alongside the boring machines. All the presses, after erection, are run for a given length of time, usually ten hours, in order to develop any defects in their construction. This is done by belting them to a portable motor of the requisite horsepower brought to the machine and placed

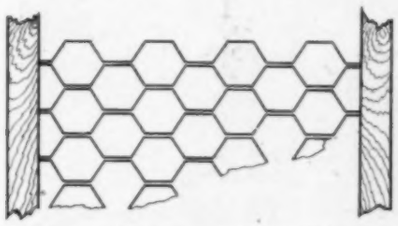


FIG. 3.—SECTION OF TOOL RACK.

at any convenient point in the central floor. A press being operated in this fashion is shown in the foreground in Fig. 2. Each clutch is thrown in and out of driving contact from 10,000 to 30,000 times, to test its hardness, freedom from temper-cracks, etc.

Types of Motor Drives.

One of the most interesting features of the shop is the method of attaching the motors to the various machine tools. A few of the tools in use were recovered from the ruins of the old shop after the fire and rebuilt, so as to make them suitable for motor drive. Many of the tools purchased in a hurry since the fire were of the standard belt-driven types and also required the designing of motor attachments. The motors on some new lathes are placed on an extended subbase and geared to the machine. On the converted lathes, a shelf has been erected over the position formerly occupied by the cone pulley, and the motor either geared to the spindle or belted to an auxiliary shaft which is geared to the spindle. The illustration, Fig. 4, shows this latter form of drive. On some of the shapers, the motor is placed on a subbase and is belted to a train of gears driving the tool or connected to the shaft thereof by means of a silent chain drive. On others, the cone pulleys are retained, a constant speed motor being mounted upon posts at the rear of the machine. On the milling machines, a bracket shelf is built on the top of the machine and carries a cone to which the motor is geared. This cone is belted to the regular speed-cone furnished with the machine; see Fig. 5. On the planers, the motor is placed on top of the housings, according to the approved modern practice. The radial drills have the motor placed on a bracket shaft built at the rear of the column. Another bracket built at the top of the column carries a cone pulley shaft driven by the motor, and it in turn drives the original cone pulley at the base of the machine, as in Fig. 6.

Minor Facilities.

Another feature of interest in the shop is the type of work bench used. These

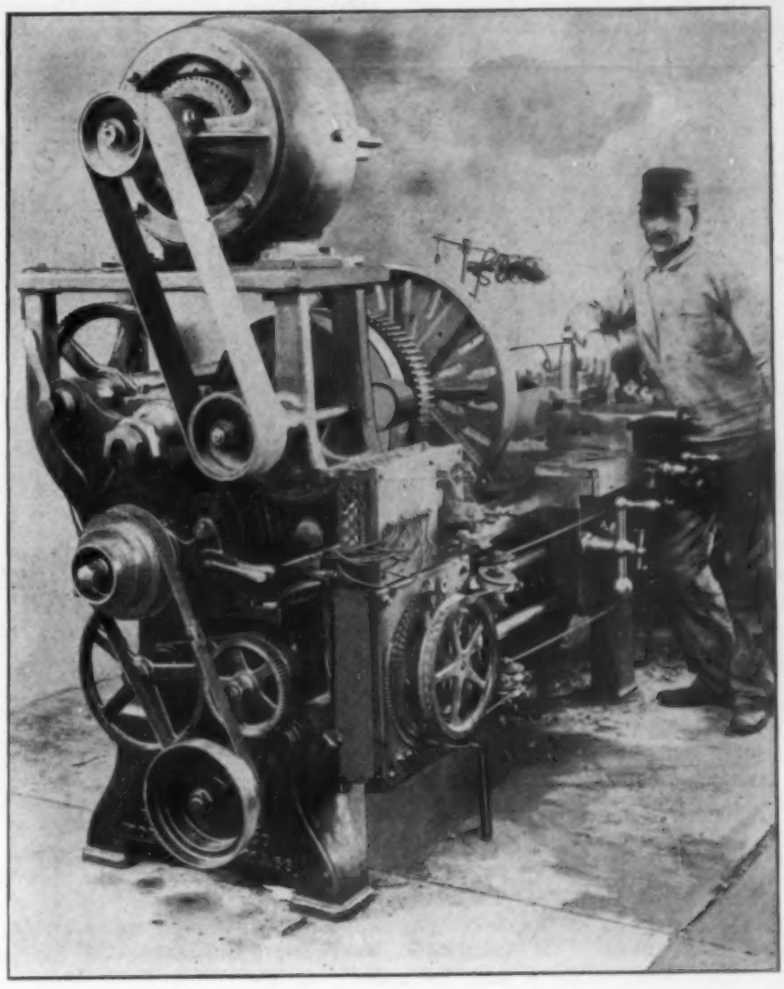


FIG. 4.—APPLICATION OF MOTOR TO LATHE.

consist of wooden tops bolted on to cast iron standards held together at the bottom by spacing pipes and rods. These benches are small in size and are scattered throughout the shop at the most convenient points. Being light and portable, they are readily placed wherever desired. Especially on the erecting floor, a number of benches will be placed alongside of a machine in the course of assembling. In the illustration of the main shop, Fig. 2, a number of these benches will be seen in the foreground, two of them being immediately alongside of a large press in the center of the floor. These are in addition to the wall benches and are a decided improvement over the usual arrangement of benches on the erecting floor which places a single long bench against the wall, it often being necessary for the workmen to travel a considerable distance every time a little work is to be done in a vise. With the arrangement in use at the Ferracute Machine Co.'s plant, the number of steps taken by the workmen on the erecting floor is reduced to a minimum. These benches are lined with heavy tin underneath and have iron shelves and drawers.

Another noticeable feature is the extensive use made of the Franklin portable cranes, one of which is seen immediately alongside of the large press previously mentioned. These light and handy appliances are a great convenience in erecting, as they frequently handle work too heavy to be lifted by the men and yet hardly large enough to call for the service of the large traveling crane. Such cranes and also all trucks and band-cars are equipped with roller bearings

The forge shop is located at one side

of the machine shop and contains an ample equipment of power hammers, cold saws and other machinery for making the various forgings required in the construction of the presses. A down draft system allows a traveling crane to pass over steam-hammer, furnaces and forges.

The pattern shop has the usual equipment of buzz saws, planers and other pattern-making tools—all driven by separate motors. The power plant located in the same building is divided into an engine and boiler room; the former contains two horizontal Curtis turbines, each connected to a 230-volt, 75-kilowatt generator, furnishing electricity for operating the various tools and cranes in the shop, and doing all the lighting. The boiler room contains a 251-horsepower, water tube boiler, which is hand fired. A switch track runs between the machine shop and the power plant, and one end is directly over a 100-ton vault into which coal can be dumped for storage purposes. The boiler room is considerably below the level of the rest of the plant and opens directly into the coal vault. Plenty of room remains for duplicating both engine and boiler plant.

The comfort of the men has not been lost sight of, and a building has been erected for their use in the triangle between the machine shop and the building containing the power plant, pattern shop, etc. A partition divides this into two parts, one of which contains the wash basins and lockers for the men, while the other portion, which is a club room, contains chairs, reading tables and magazines for the men's use.

The office building, in addition to the general offices of the company, contains a drafting room and a unique photographic dark room. This room has no door, but its entrance is through a labyrinth whose surfaces are painted a dead black. Good ventilation is always secured, and in addition, it is always accessible to anyone who desires to converse with any person engaged in it. The plant is located alongside the Bridgeton branch of the Pennsylvania railroad, and a spur track from this road provides the shipping facilities.

The officials of the company are Oberlin Smith, president, engineer and general manager; Percival H. Smith, vice president; Enos Paullin, secretary and treasurer; Henry A. Janvier and William Ware, assistant engineers, in charge of press work and die work, respectively.

A summary for showing San Francisco's condition in December contains the following: Building permits, 687, value, $5,373,140; permanent building permits, 403; permanent building permits since the fire, 3,089; building contracts recorded, 208, value, $2,234,424; real estate transfers, 820, value, $3,500,000; postal receipts, $143,450; custom receipts, $1,012,609.79; bank clearings, $196,216,734.68, December, 1905, $161,317,530.53.

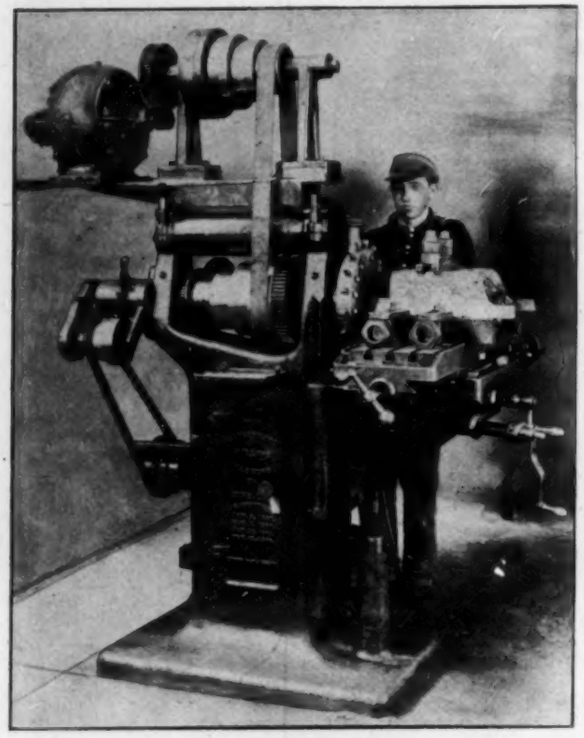


FIG. 5.—MILLING MACHINE, MOTOR-DRIVEN.

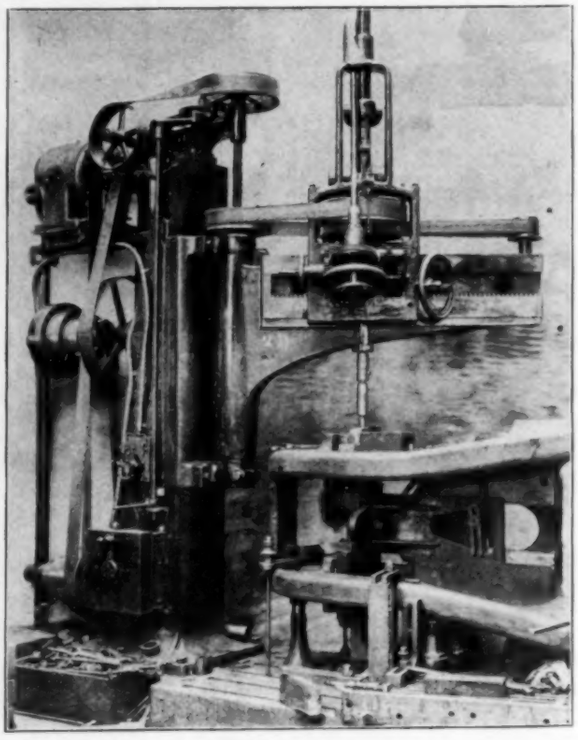


FIG. 6.—MOTOR-DRIVEN RADIAL DRILL.

GAS FOR HEATING AND REHEATING.

At a recent meeting of the Staffordshire Iron & Steel Institute, Mr. Charles H. Wall read a paper on "The Use of Gas for Heating and Reheating Purposes," an abstract of which follows:

The paper devotes some space to the theory of gas production and then gives a short history of the introduction of gas producing apparatus describing the producers of Bischof, Ekman, Ebelman and the Siemens. The author next considers the gaseous fuel of the producer and discusses the effect of the admission of air at various points in the producer. He presents the analyses of gases obtained from different types of producers and states that the actual heat loss in the heater does not exceed from 9 to 12½ per cent of the heat of the original solid fuel. The great secret of the success of gas firing is due to the fact that it does away with the intermittent series of heating and partially cooling actions which are unavoidable in coal fired furnaces and substitutes for them direct contact of flame with the heating surfaces which gives a constant and steady application of the temperature desired. Gas firing starts with the advantage of being capable of using the cheaper kinds of slack and small coal, which will give any required degree of heat.

The author then discusses the application of producer gas to furnaces, and divides the designs of gas fired furnaces into six groups: namely, furnaces with reversing regenerators or accumulators; furnaces with continuous regeneration of heat; furnaces without heat regeneration; blow pipe furnaces, with or without heat recuperation; kilns, and furnaces having a gas producer as part of the structure of each.

In concluding the paper, the author points out the economies which are possible by using producer gas as fuel instead of coal.

In the discussion which followed, the chairman said that there was no study more necessary or interesting to iron manufacturers than that of economy. He was pleased to learn from the colliery proprietors of Staffordshire that the supply of coal in their county would go on for many generations, but still it behooved them to be careful that they got the proper use out of the coal which happened to be in their district.

Walter Jones, Stonebridge, presented a long discussion in which he attacked the British thermal unit as a measure of heat, and questioned the value of it when used at high temperature, but offered nothing to replace it.

A. E. Edwards said that his experience in gas producers had been chiefly confined to smaller producers than those of which Mr. Wall had spoken, and were mainly worked for melting brass and similar metals. He drew attention to the portion of the paper which spoke of the importance of the preliminary heating of the air where gas was used for boiler heating. He should be glad to know how Mr. Wall would heat the air to any high temperature. Then they had on the table one of Allday's nozzles, used in connection with blow pipe furnaces. He always thought those nozzles were more complicated than necessary. Any regulation required could be obtained just as readily with the tap as with the screws on the nozzle in question. Left with some men it was apt to get out of order. He had had to adjust it himself, and tell the men to leave it severely alone. He endorsed Mr. Wall's remarks in regard to the time saved by gas heating in pottery firing. By the ordinary process it took twenty-four hours to get the ware in, heated, and out again. He had seen the Dalston producer in which ware was fired in about two hours. By this system which had been working now for two or three years they got the stuff in and out again in three to four hours, instead of twenty-four hours.

In brass melting they used anthracite coal, and found it very economical for the small quantities of metal they wanted, about six or seven hundredweight a day. They had put in a twin furnace, the waste gas of the one going towards heating the other, and by that means had reduced the quantity of coal consumed by 40 per cent. If instead of using anthracite they had used ordinary Black country slack they would have again reduced the cost, and brought it down to a lower rate than had ever been obtained for brass melting.

Mr. Frank Somers said that he endorsed rather than criticized Mr. Wall's remarks. After practical experience with fifteen gas producers for boiler firing, he cordially agreed with what Mr. Wall had said about the importance of the preliminary heating of the air, and also with his remarks against the practice of using producer gas for steam boilers being too hastily formed on that of using the waste gas from blast furnaces. In some large works today, cold air is still used. If hot air were used there would be a great economy, but of course some firms would not trouble to go into the question of economy. Electricity bore the same resemblance in relation to power as gas did to heating. With the latter process far less cleaning was required in the flues, and there were many other advantages and economies. If, when people first tried the system they would take the precaution to start on the proper lines according to their requirements, he was sure they would be satisfied with the results.

Mr. Stanway understood that the British thermal unit was a fixed quantity. Speaking upon the question of Allday's furnaces he said that he was persuaded to put in a gas engine to drive the air pressure of four gas heated rivet furnaces. Briefly, they had to take them out again in six weeks and acknowledge them to be no good. In comparison with their own make of ordinary rivet furnace they had not found any gas furnace a success for heating rivets. Some time ago it was on the boards that they should put down a big gas furnace for heating plates for bogies, etc., but instead they put down a coal fire furnace about 25 by 6 feet. The idea was that they should heat two plates at a time. When they got to work they found, however, that it was no use trying to heat two plates together. They would not do either side by side or the one on the other, and they had to abandon the idea, so that they had now a furnace twice as big as it need have been.

Mr. Wall, replying, said that he disagreed with Mr. Jones upon the question of the standard unit of heat. One pound of water was raised one degree Fahrenheit by one British thermal unit. They all knew that when they increased their temperatures, the matter became more difficult, and some of them varied about it, but for the sake of regulation there must be a basis. Replying to Mr. Edwards, Mr. Wall said that concerning the question of boiler firing with gas producers, he considered it uneconomical without regenerative chambers. In some places they had put down furnaces and large quantities of gas gave off. That would really have been a waste if it had been allowed to simply go away in the atmosphere. With regard to the nozzle and the regulation of the pressure he argued that when supplying furnaces with air there should be a constant pressure of air through one cock, and gas through another, that the pressure could not be regulated so well by turning one cock as with the nozzle in question. He was quite aware that things got out of order sometimes when left to the mercy of the workmen. Most likely, when left alone the man would not regulate the nozzle at all, especially if he had anything else to attend to.

In regard to Mr. Frank Somers they were practically of the same mind upon that subject. To obtain the higher temperature it was absolutely necessary that they should have regenerative chambers. One furnace would do for one thing, but would be quite useless for another, not because anything was wrong with the gas furnace itself, but simply because people did not put in the right thing for their purpose. Everyone should be absolutely clear on this point before they put them down. Manufacturers were too reticent in giving the proper information when puting furnaces down. They sometimes said that they required them for a certain purpose when in reality they wanted them for something quite different.

Respecting Mr. Stanway, and his rivet furnaces, he could not say much unless he saw the furnaces, then he might pass an opinion. Working under ordinary conditions he denied that it was possible to get more oxidation in gas than in coal fired furnaces. Simple mistakes could be made. Perhaps they did not regulate their gas and air valves in the proper proportions. They could get any flame they liked by regulating the air in proportion to the gas consumed.

PATERNALISM AND THE YELLOW PRESS.

COLONEL BOPE DISCUSSES TENDENCIES OF THE TIMES,

Predicting that Disaster Will Come if Restriction of Business Enterprises is Continued.—More Thinking Needed.

At the annual banquet of the Engineers' Society of Western Pennsylvania, held at the Hotel Schenley, Pittsburg, Jan. 12, Col. H. P. Bope, vice president of the Carnegie Steel Co., in responding to the toast, "Common Honesty and Commercialism," said:

"It is not necessary for me to talk about the age of commercialism. We go farther back than either law or engineering. In fact, the first recorded transaction was the barter of honor and truth in the Garden of Eden for an apple. And we come down through the ages with our equally great names. We do not know the names of the great commercial leaders of antiquity any more than you know the names of the great lawyers or engineers. Suffice it to say that they existed, because we have the record of their transactions. What would engineering, or law either, have been without the problems created by commercialism? The Phoenecians, the Greeks, the Persians, the Romans, the Carthagenians, all, were great traders. Their ships navigated the oceans of the world. They carried the food and the products of every nation from one to the other. They carried civilization, they carried progress. The crusades broke through the barriers between the west and the east, for instance. Through the commercial relations established between the western and the eastern nations, far more important to us today than the attempts made by the crusaders to take the Holy City, commercialism has played a wonderful part in the world's history. It has been at the basis of all civilization and all progress, it has been in the various arts and sciences and religion and literature, it has appeared there, as we know, for weal or for woe. On some of the things where it has appeared it has left the slimy trail of the serpent; in other things it has been the guiding movement which has made the advancement of mankind possible.

BANQUET OF THE ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA, AT PITTSBURG.

Commercialism in Journalism.

"There are so many things in connection with this great subject that I hesitate to choose; but it seems to me that there are two things today of paramount importance to every one of us, not so much in relation to our business positions, not so much to the accumulation of wealth that we may be trying to attain, but in those things which affect us as a nation and as individuals. The first of these two is commercialism in modern journalism. If you have watched the papers of the so-called 'yellow press' you will have noticed that many of our great captains of industry have been pilloried in the press, described, represented, by the largeness of their being as 'bloated' in their wealth, marked all over with the dollar mark, held up to the ridicule of the nation, and in every way made to feel that the wealth which they have obtained,—in very many cases by industry, integrity, ability,—is a crime. Now we do not deny that there have been some men in connection with the great trusts and associations during the past few

years who have done things contrary to moral and business ethics, but we do maintain that the great majority of the business men of today are honest, true and upright, that they are guided by the highest principles of business morality and integrity in their dealings with each other.

"Judge Shafer spoke somewhat in relation to the formation of institutions, and he tells us how a professional man is made. Well, then, we commercial men must be very unprofessional, because under recent laws we are not even allowed to organize, we are not even allowed to consult, we are not even allowed to meet together, we are not even allowed to gather around a social board and discuss economic conditions, we are not allowed even to meet and say what a price may be or what we think it ought to be to maintain a steady market and stable conditions. The professional man today has his ethics, but he is permitted to do things. The commercial man today is so hedged around by laws and by regulations that he has become a nonentity. There never have been in the history of the world such laws governing commerciality as there are today, laws which are so strict and so binding as to restrict effort and to make it impossible for us to carry business along upon the highest and best plan for the interest of all the people. Now that may be a very strong statement, but it is true. The federal government today, under the leadership of certain men in a great party, have advanced along the line of paternalism to an extent which is alarming.

Do Not Think Enough.

"The American people are a mercurial people, strange as it may sound. We have in us all the elements of all the nations in the world. We are a great reading nation, but we are a very poor thinking nation. We read vastly more than we think and we are led by leaders who think for us while we read what they are thinking and we do not think for ourselves. As a result of this, I want to say that I believe the tendency of modern times is entirely in the wrong direction, that the pendulum has swung too far in the direction of paternalism and the regulation of commercial matters which affect every man. The mayor said that the municipality goes nearer to the average house holder than any other agency in his life. Is it true? Has not within the past few years the general government enacted laws whereby the very food we eat is regulated and inspected and tested, and under laws regulating child labor does it not go almost into the farm as well as into the factory? Should we not as thorough business and conservative men recognize the tendency of the times? Do you think it is possible to sow the wind and not reap the whirlwind? Do you thing it is possible to restrict commercialism, commercial methods, by laws which are binding, in some respects unjust, and yet maintain the standard of business prosperity which has made this country so great? Why, the whole business of this country has been made possible through unrammeled intercourse between the states, and now we are beginning to regulate that traffic by regulations of the railroads and of corporations and of trusts and in every line of this commercialism, so that we who are members of it are made to feel that we are almost outside the pale of good society.

Chancellor Day's Position.

"The engineer is judged by the works he either makes or plans. The commercial man is judged guilty by the industry and the effort he makes to advance in his line and to help all the people. A great English essayist said once that merchants are by far the most useful members of any commonwealth. They distribute the products of nature, they bring the interests of the world close together, they give employment to the poor and they give wealth to the rich. Modern legislators do not seem to think that to be the case, but rather that the average merchant is a guilty man. He is adjudged guilty before he is tried. If he becomes rich through his own energy and industry, he is 'bloated'; he has obtained his wealth by unfair means. And when an honest, upright, progressive man like Chancellor Day, of Syracuse university, dares to pass upon and denounce these methods and point out in a common-sense way the conditions and tendencies of the times, he is pilloried by the public press and held up to contumely by the legislatures as being utterly unthinking and untruthful. It seems to me this whole question of abuse of wealth arises from envy and jealousy and malice, as is well summed up in a little story which Henry Clewes the banker told in Boston a few days ago in an address to a somewhat similar meeting to this. Two Irishmen were discussing that well-worn question, the Rockefeller wealth. Said one to the other. 'Mike, do you think Mr. Rockefeller's wealth is tainted?' 'Of course I do,' he says, 'Pat, of course it is tainted. It's tainted twice, 'taint yours and 'taint mine.'

The Crusade Against Wealth.

"That is the essence of this crusade against wealth today, gentlemen. It lies at the foundation of the attacks on wealth and on honest effort. These are the two conditions of commercialism today which seem to me to be the most dangerous, the commercialism of the press, which goes with every wind,—not all, thank God, there are honest papers as there are honest jurists, because the courts and a few of our great newspapers of the country have as yet been unaffected by this wild cry against the accumulation of wealth. But they are the important problems which commercialism is meeting today, the attacks of the yellow press and the paternalism of the federal government, both of which are tending too strongly in the wrong direction. And unless we in some measure through conservative management get them turned the other way, they are bound to affect commercial conditions in the very near future. I would not wish to be thought a pessimist, but it seems to me that there are conditions arising today which, affecting as they do and will continue to affect greatly, unless checked, the progress of this nation, that we may expect that the whole people will be affected. It will not be the great producer of wealth, the men that have wealth, who will suffer. They have means of taking care of themselves. But it will be the great mass of the common people, those to whom wealth gives employment, those who are in the factories and the mines and the mills and the shops, the men who labor, who obtain daily wage,—they are the ones who will be affected by these conditions, by an industrial depression which will be more distressing than the days of 1893, so familiar to many of you, when the soup house was such a common thing in the various cities of our community. But if we can direct these energies in the proper direction, with the industry, intelligence and integrity of the great American people, we may expect that these problems—and there are others beside those that I have mentioned—will yet be solved in a manner which will be for the interests of the whole people. The American people are not bad at heart. They are optimists. But sometimes they become pessimistic. Never before in the history of the country have they been studying these great economic and commercial problems as they are today. The best thought of the country is directed

upon them. And I believe they will yet solve them. But the tendencies of today in the directions I have indicated must be checked, or that solution will not come until we have suffered too greatly and the progress of this country most seriously checked."

N. F. A. COMMITTEES.

The district committees of the National Founders' Association are as follows:

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THE CLARK MINE CASE.

The decision rendered by Judge Cant establishing the Clark Iron Mining Co. in its title to the Clark mine, of which mention was made in the last issue of THE IRON TRADE REVIEW, was based on the following evidence very briefly reviewed:

Held Tax Title.

The Clark Iron Co., and its sublessees, discovered and developed the Clark and Leonard mines under the belief that their title was unquestionable, as they had held it under a tax title since 1892. At the time of their occupation of the land they had evidently not known of any claims upon it, for subsequently, on investigation, when they learned from the records that a homestead right covering the porperty had been granted to James M. Rogers, they attempted to clinch their title by taking the claimants into the company, and securing the deed from James M. Rogers. In April, 1903, John McClintock, acting with Wilson G. Crosby, notified the Clark Iron Co. that they personally claimed to be owners in fee of, approximately, two-thirds' interest in the property and that they represented the owners of the remaining interest. Their claim was that the deed from James M. Rogers, which the Clark Iron Co. had bought to strengthen its tax title, while a valid instrument and not a forgery, was from the wrong James M. Rogers, and that the man who executed it never made the homestead application involved. The Clark company was forced to admit the truth of this statement upon investigation and then bought the claims of McClintock, Crosby and of the heirs, the transaction being carried out completely by McClintock and Crosby without either the guardian or heirs appearing. The heirs later brought suit claiming that the transaction was a fraudulent deprivation of their rights by the mining companies and McClintock and Crosby.

Had Sold the Land.

The court ruled that the action of McClintock and Crosby was not necessarily a fraudulent one. Evidence was brought to show that the James M. Rogers, who made the application for the homestead right, had sold his rights to one Freed, who made the purchase in the name of Charles D. Gilmore, of Washington, D. C. Later the property was again transferred to General James H. Baker, of Minnesota. It was shown that General Baker had made no effort to establish his claim to the porperty and had paid no taxes upon it. The court in its decision pointed out that whatever rights to the property existed from ownership traceable to the homestead rights of Rogers, had been conveyed to General Baker and that therefore the Rogers heirs in reality had no claim upon the property. The interesting feature of the case was the development that James M. Rogers, to whom the homestead was conveyed, under the statute that soldiers in the Union army, honorably discharged, were entitled to such homestead rights, was in reality not a Union soldier, but had belonged to the Confederate army. How it came about that Rogers had been granted this right by the government without the necessary coincident record of his service as a Union soldier, the court made no attempt to clear up, finding no satisfactory explanation.

WANT INVESTIGATION.

By a vote of 107 to 0, the lower house of the Minnesota legislature at St. Paul, Jan. 14, adopted a resolution directing a legislative investigation of the transaction by which J. J. Hill, president of the Great Northern railroad, leased certain ore lands to the United States Steel Corporation. The claim is made that the Great Northern railroad's charter does not permit the company to deal in ore lands.

Confirmation of the receiver's sale of the properties of the Diamond State Steel Co. to John B. Newkirk of Philadelphia and others will be made about Feb. 15, before which time the balance of the purchase money must be paid or bonds given. The plant sold for $575,000. Albert R. Jones, of the Hilles & Jones Co. and Henry Whitely, president of the McCullough Iron Co., have testified to the Federal court that in their opinion the price secured was fair and that higher figures would not be obtained.

THE ART OF CUTTING METALS[1]

(Continued from last week.)

By Fred W. Taylor.

Proper Shape for Standard Shop Tools.

As stated in part 1 of this paper, our principal object in carrying on the investigation has been to obtain the knowledge required in fixing daily a definite task, with a time limit, for each machinist. It is evident that this involves the use of standard cutting tools throughout the shop which are in all respects exact duplicates of one another.

A Few Carefully Considered Types of Tools Better Than Great Variety.

In our practical experience in managing shops we have found it no easy matter to maintain at all times an ample supply of cutting tools ready for immediate use by each machinist, treated and ground so as to be uniform in quality and shape; and the greater the variety in the shape and size of the tools, the greater becomes the difficulty of keeping always ready a sufficient supply of uniform tools. Our whole experience, therefore, points to the necessity of adopting as small a number of standard shapes and sizes of tools as practicable. It is far better for a machine shop to err upon the side of having too little variety in the shape of its tools rather than on that of having too many shapes. And the energy of the department for maintenance of tools should be directed rather toward securing an ample and uniform supply of tools limited to a few shapes than to a great variety. The writer can hardly lay too much stress upon this point and it, therefore, becomes all the more important to use the greatest care and judgment in selecting the standard shape which is to be used for roughing tools.

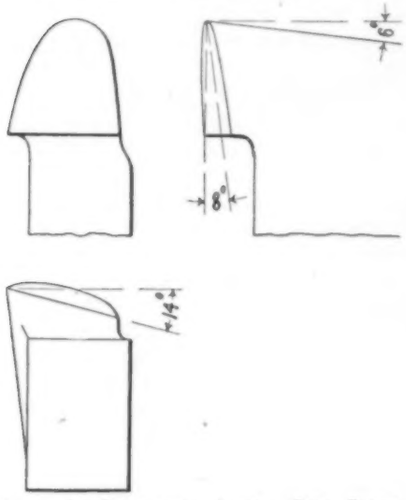


Fig. 16.—Clearance Angle Side Slope and Back Slope in Standard Tools for Cast Iron and Hard Steel.

Standard Tools Illustrated.

In Figs. 16-26, are illustrated the shapes of the standard tools which we have adopted, and in justification of our selection the writer would state that these tools have been in practical use in several shops both large and small through a term of years, and are giving general, all-round satisfaction It is a matter of interest also to note that in several instances changes were introduced in the design of these tools at the request of some one foreman or superintendent, and after a trial on a large scale in the shop of the suggested improvements, the standards as illustrated above were again returned to. These shapes may be said, therefore, to have stood the test of extended practical use on a great variety of work.

It would seem to be of such great importance to explain fully our reasons for adopting these tools as our standards, that the writer will describe in the pages immediately following a number of the experiments, the results of which have perhaps had the greatest influence in determining the curve or line of the cutting edge. With this end in view, it has been found necessary to record these experiments out of the order and the place in this paper in which they would otherwise be properly and logically described.

Conflict Between the Different Objects to be Attained in Cutting Metals Which Affect the Design of Standard Tools.

Our standard tools may be said to represent a compromise in which each one of the elements given in the next paragraph has received most careful consideration, and has had its due influence in the design of the tool; and it can also be said that hardly a single element in the tools is such as would be adopted if no other element required consideration.

The following, broadly speaking, are the four objects to be had in mind in the design of a standard tool: *a*, the necessity of leaving the forging or casting to be cut with a true and sufficiently smooth surface; *b*, removing the metal in the shortest time; *c*, the adoption of that shape of tool which shall do the largest amount of work with the minimum combined cost of grinding, forging, and tool steel; *d*, ready adaptability to a large variety of work.

As we go further into this subject the nature of the conflict between these four objects and of the sacrifice which each element is called upon to make by one of the others will become apparent. To illustrate the nature of these compromises:

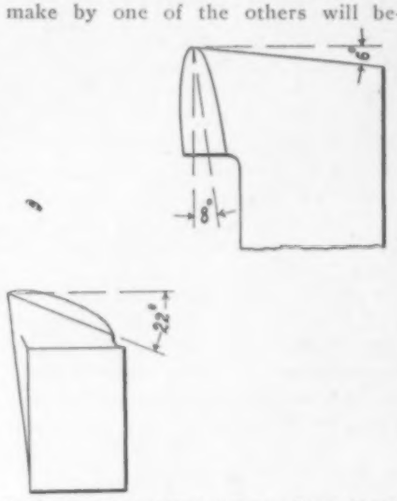


Fig. 17.—Clearance Angle Side Slope and Back Slope in Standard Tool for Medium and Soft Steel. Tool About Two-Thirds Used Up.

Generally speaking, we have been obliged to adopt as our standard shape a tool which can be run at only about, say, five-eighths of the cutting speed which our knowledge of the art and our experiments show us could be obtained through another tool of entirely different shape if no other element than that of cutting speed required consideration.

We have been obliged to sacrifice cutting speed to securing smaller liability to chatter; a rather truer finish; a greater all-round convenience for the operator in using the tool; and a comparatively cheaper dressing and grinding. The most important of the above considerations, however, is the freedom from chatter.

On the other hand, we have been

[1]Presidential address, A. S. M. E., 1906.

obliged to adopt a rather more elaborate and expensive method of dressing the tools than is usual in order to provide a shape of tool which allows it to be ground a great many times without redressing, and also in order to make a single Taylor-White heat treatment of the tool last longer than it otherwise would. And again, the shape of the curve of the cutting edge of the tool which we have adopted—first, to insure against chatter, and second, for all-round adaptability in the lathe,—calls for much more expense and care in the grinding than would be necessary if a more simple shape were used. This necessitates in a shop either a specially trained man to grind the tools by hand to the required templets and angles or, preferably, the use of an automatic tool grinder.

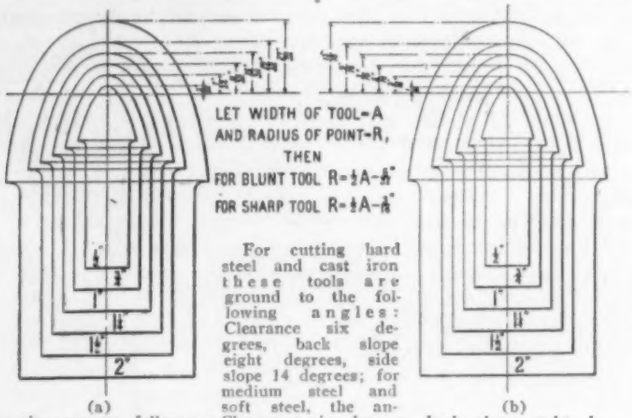

LET WIDTH OF TOOL=A
AND RADIUS OF POINT=R,
THEN
FOR BLUNT TOOL R=½A-1/32"
FOR SHARP TOOL R=½A-1/16"
For cutting hard steel and cast iron these tools are ground to the following angles: Clearance six degrees, back slope eight degrees, side slope 14 degrees; for medium steel and soft steel, the angles are as follows: Clearance six degrees, back slope eight degrees, side slope 22 degrees.
(a)
(b)

FIG. 18.—EXACT OUTLINE OF CUTTING EDGE FOR STANDARD ROUND NOSE TOOLS FROM ½ X ¾ TO 2 X 3 INCHES.
(a) Blunt tool for cutting hard steel and cast iron.
(b) Sharp tool for cutting medium and soft steel.

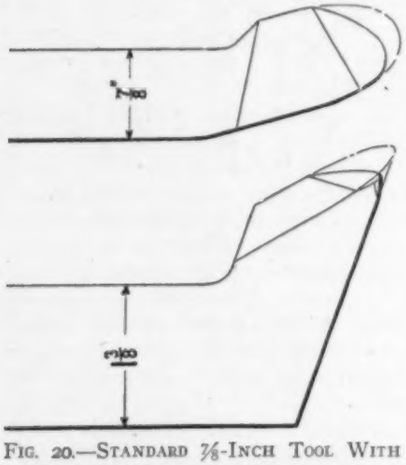


FIG. 20.—STANDARD ⅞-INCH TOOL WITH WHICH MOST OF THE EXPERIMENTS WERE MADE.

Before describing in detail the considerations which led to the adoption of our standard tools, it will be necessary to explain some of the more important experiments which have a direct bearing upon this subject. The shape of our standard tools will be again treated.

Elements Affecting Cutting Speed of Tools in the Order of Their Relative Importance.

The cutting speed of a tool is directly dependent upon the following elements. The order in which the elements are given indicates their relative effect in modifying the cutting speed, and in order to compare them, we have written in each case figures which represent, broadly speaking, the ratio between the lower and higher limits of speed as affected by each element. These limits will be met with daily in machine shop practice.

(A) The quality of the metal which is to be cut; i. e., its hardness or other qualities which affect the cutting speed.

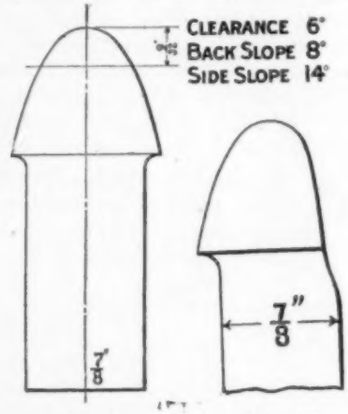


FIG. 21.—SHAPE OF NOSE OF TOOL, FIG. 20.

Proportion is as 1 in the case of semi-hardened steel or chilled iron to 100 in the case of very soft low carbon steel.

(B) The chemical composition of the steel from which the tool is made, and the heat treatment of the tool.

Proportion is as 1 in tools made from tempered carbon steel to 7 in the best high speed tools.

(C) The thickness of the shaving; or, the thickness of the spiral strip or band of metal which is to be removed by the tool, measured while the metal retains its original density; not the thickness of the actual shaving, the metal of which has become partly disintegrated.

FIG. 19.—OUTLINE OF CUTTING EDGE OF TOOL FOR TAKING SHALLOW CUTS WITH WIDE FEEDS IN CAST IRON.

Proportion is as 1 with thickness of shaving 3-16 of an inch to 3½ with thickness of shaving 1-64 of an inch.

(D) The shape or contour of the cutting edge of the tool, chiefly because of the effect which it has upon the thickness of the shaving.

Proportion is as 1 in a thread tool to 6 in a broad nosed cutting tool.

(E) Whether a copious stream of water or other cooling medium is used on the tool.

Proportion is as 1 for tool running dry to 1.41 for tool cooled by a copious stream of water.

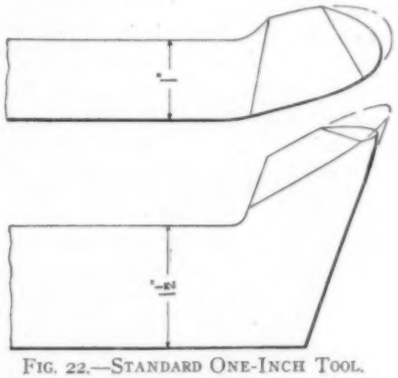


FIG. 22.—STANDARD ONE-INCH TOOL.

(F) The depth of the cut; or, one-half of the amount by which the forging or casting is being reduced in diameter in turning.

Proportion is as 1 with ½ inch

depth of cut to 1.36 with ⅛ inch depth of cut.

(G) The duration of the cut; i. e., the time which a tool must last under pressure of the shaving without being reground.

Proportion is as 1 when tool is to be ground every 1½ hours to 1.207

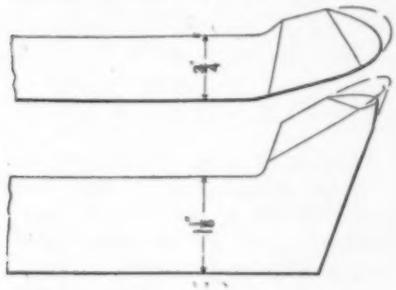


FIG. 23.—STANDARD ¾-INCH TOOL.

when tool is to be ground every 20 minutes.

(H) The lip and clearance angles of the tool.

Proportion is as 1 with lip angle of 68 degrees to 1.023 with lip angle of 61 degrees.

(J) The elasticity of the work and of the tool on account of producing chatter.

Proportion is as 1 with tool chattering to 1.15 with tool running smoothly.

A brief recapitulation of these elements is as follows:

(A) quality of metal to be cut: 1 to 100.

(B) chemical compositon of tool steel: 1 to 7.

(C) thickness of shaving: 1 to 3½.

(D) shape or contour of cutting edge: 1 to 6.

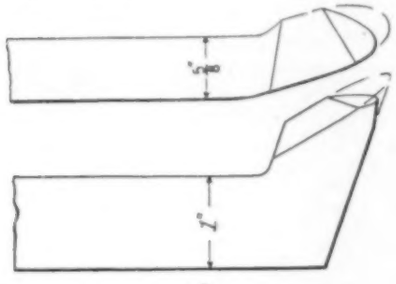


FIG. 24.—STANDARD ⅝-INCH TOOL.

(E) copious stream of water on the tool: 1 to 1.41.

(F) depth of cut: 1 with ½ inch depth to 1.36 with ⅛ inch depth of cut.

(G) duration of cut. 1 with 1½ hour to 1.20 with 20-minute cut.

(H) lip and clearance angles: 1 with lip angle 68 degrees to 1.023 with lip angle of 61 degrees.

(J) elasticity of the work and of the tool: 1 with tool chattering to 1.15, with tool running smoothly.

The quality of the metal which is to be cut is, generally speaking, beyond the control of those who are in charge of the machine shop, and, in fact, in most cases the choice of the hardness of metals to be used in forgings or castings will hinge upon other considerations which are of greater importance than the cost of machining them. This subject will be further treated later.

The chemical composition of the steel from which the tool is made and the heat treatment of the tool will, of course, receive the most careful consideration in the adoption of a standard tool. No shop, however, can now afford to use other than the "high speed tools," and there are so many makes of good tool steels, which, after being forged into tools and heated to the melting point according to the Taylor-White process, will run at about the same high cutting speeds, that it is of comparatively small moment which particular make of high speed steels is adopted. This subject also will be further dealt with.

Effect of Thickness of Shaving on Cutting Speed the Most Important Subject for Experiment.

It is the thickness of shaving, then (item C in the list above) which must be first considered, as this element has more effect upon the design of our standard tools, and in fact upon the whole problem of cutting metals than any other single item which is completely under the control of those who are managing a shop.

Experiments Showing Effect Upon Cutting Speed of Varying the Thickness of the Shaving, a Tool with Straight-Edge Being Used, Removing a Shaving in All Cases Exactly One Inch Long.

The following experiments were made to determine the effect upon the cutting speed of varying the thickness of the shaving. For this purpose a number of broad nosed tools with straight cutting edges, similar to that shown in Fig. 27, were forged from ordinary tempered carbon tool steel. Straight cutting edges were used in order that the shaving should be of the same thickness throughout. The corner of the tool, however, which cuts at the smaller of the two diameters of the forging was rounded to a radius of exactly ⅛ of an inch. This was necessary in order to thin the shaving down sufficiently at this point to absolutely insure that part of the tool which gives the required smoothness to the forging from giving out before the tool dulls along the straight line of the cutting edge.

In these experiments the tool was set in the lathe as shown in Fig. 28,

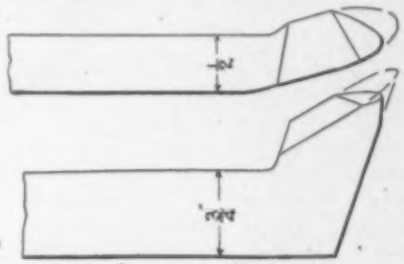


FIG. 25.—STANDARD ½-INCH TOOL.

so that exactly one inch of the straight portion of the cutting edge was at all times under pressure of the shaving. In all cases a feed of 8-100 of an inch was used, so that the thickness of the shaving was in each case directly proportional to the depth of the cut.

These experiments were made upon a forging of the following chemical composition:

Carbon	0.369 per cent
Manganese	0.517 per cent
Silicon	0.238 per cent
Phosphorus	0.043 per cent
Sulphur	0.051 per cent

Tensile test bars actually cut from the body of the forging showed the following physical properties:

Tensile strength	82,947 lbs.
Stretch	21.50 per cent
Contraction of area	30.00 per cent

A heavy stream of water was thrown throughout the experiments upon the shaving just at the spot at

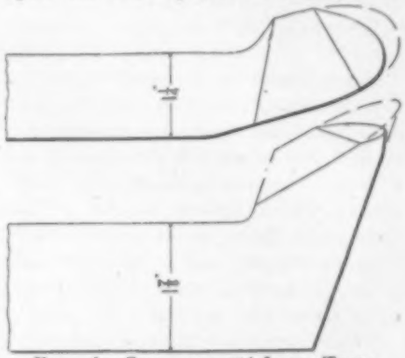


FIG. 26.—STANDARD 1¼-INCH TOOL.

which it was being removed from the forging by the tool. Depths of cut of exactly ⅛, 3-16, ¼ and ⅜ inch were used, corresponding to thicknesses of shaving of 0.01, 0.015 0.02 and 0.03 inch.

The speeds corresponding to these cuts, each of which was of 20 minutes' duration, are given in the table Fig. 29. These cutting speeds are plotted in Fig. 15, and a

curve corresponding to the following formula is drawn approximately through these various points. They are also plotted on logarithmic paper, in Fig. 14, on which the speed points lie approximately in a straight line

$$V = \frac{1.54}{t^{\frac{2}{3}}}$$

in which

V = cutting speed in feet per minute for 20-minute cut;

t = thickness of shaving in inches.

In Table 29, will be seen also the ratio between the cutting speeds of each of these thicknesses of shaving, from which it will be noted, for example, that by dividing the thickness of the shaving by 3, the cutting speed is increased in the ratio of 1 to 1.8.

Experiments Showing Effect Upon Cutting Speeds of Varying the Depth of the Cut, a Tool with Straight Edge Being Used, Removing in all Cases Shaving 0.03 Inch Thick.

Tools of the same shape as those shown in Fig. 27, were set in the exact position shown, and in Fig. 30, we show in section lines the sizes and proportions of the chips, so that with a feed of 0.08 inch the tool in all cases removed a shaving 0.03 inch thick. The experiments were made upon the same forging, and with otherwise exactly the same conditions as those described just above for determining the effect of thickness of shaving upon cutting speed. Such depths of cut were used as to bring consecutively 1-3 inch, 2-3 inch and 1 inch in length of the straight portion of the cutting edge under the shaving.

These experiments were made upon a forging of the following chemical compostion:

Carbon	0.492 per cent
Manganese	0.477 per cent
Silicon	0.194 per cent
Phosphorus	0.042 per cent
Sulphur	0.039 per cent

Tensile test bars actually cut from the body of the forging show the following physical properties:

Tensile strength	97,719 lbs.
Stretch	15 per cent
Contraction of area	23.2 per cent

The cutting speeds corresponding to these three depths of cut are given in the table, Fig. 31. These speeds are plotted in Fig. 32, and a curve corresponding approximately to the following formula is drawn through these various points. They are also plotted on logarithmic paper, in Fig. 33, on which the speed points lie approximately in a straight line.

$$V = \frac{12.22}{L^{\frac{7}{12}}}$$

in which

V = cutting speed in feet per minute for 20-minute cut.

L = length of shaving in inches.

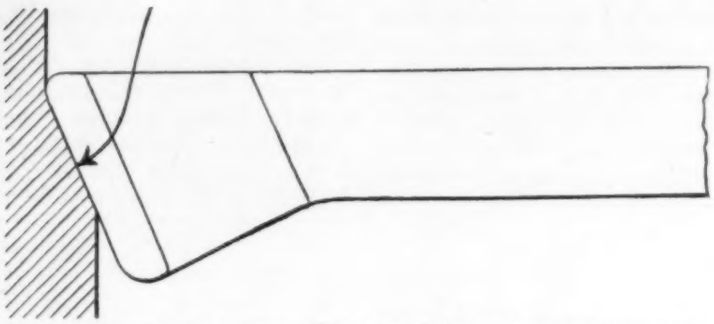


FIG. 27.—STRAIGHT EDGE TOOL; ONE INCH OF CUTTING EDGE UNDER CUT.

In the table, Fig. 31, will also be seen the ratio between the cutting speeds of each of these depths of cut, from which it will be noted, for example, that by dividing the length of the cutting edge by 3, the cutting speed is increased in the ratio of 1 to 1.27.

Attention is called to the fact, however, that with round nosed tools as the depth of cut becomes more shallow, there is a greater increase in the cutting speed than in the case of tools having straight line cutting edges, because, as explained in the next section with a round nosed tool the thickness of the shaving becomes thinner and thinner as the extreme nose of the tool is approached. In the case of round nosed tools, therefore, when the depth of the cut is diminished, the cutting speed is increased for two entirely different reasons: First, because the chip bears upon a smaller portion of the cutting edge of the tool; and second, because the average thickness of the chip which is being removed is thinner in the case of round nosed

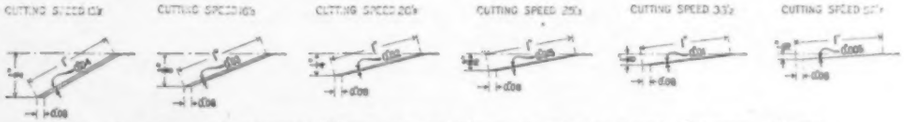


FIG. 28.—CHIPS OBTAINED WITH TOOLS WITH STRAIGHT LINE CUTTING EDGES.

Shows that with straight line cutting edge chip is of uniform thickness; that thickness varies according to angle cutting edge makes with axis of work on lathe, and also with thickness of feed; tool used shown in Fig. 27.—Speeds recorded in Table 29.

LENGTH OF SHAVING IN INCHES	DEPTH OF CUT IN INCHES	THICKNESS OF SHAVING IN INCHES	CUTTING SPEED, IN FEET, ON MEDIUM STEEL FORGING		CUTTING SPEED, IN FEET, ON HARD STEEL FORGING	
			FROM EXPERIMENTS	BY FORMULA $V=\frac{1.54}{t^{\frac{2}{3}}}$	FROM EXPERIMENTS	BY FORMULA $V=\frac{0.775}{t^{\frac{2}{3}}}$
1	1/12	0.005		52.7	15.1†	15.3
	1/4	0.010	33.0	33.2	10.4	10.3
	1/12	0.015	26.0*	25.3	8.8	8.2
	1/4	0.020	21.0	20.9	7.0	7.0
	3/4	0.030	16.0	16.0		5.6
	1/2	0.040		13.2		4.7

* One experiment only. † Two experiments only.

If we have the cutting speed for a shaving of a given thickness, we find the cutting speed for a shaving of:

	MEDIUM STEEL	HARD STEEL	AVERAGE
2 times the given thickness by multiplying by	0.63	0.67	0.65
3 times the given thickness by multiplying by	0.48	0.54	0.51
4 times the given thickness by multiplying by	0.40	0.46	0.43
1/2 the given thickness by multiplying by	1.59	1.48	1.53
3/4 the given thickness by multiplying by	2.08	1.86	1.97
1/4 the given thickness by multiplying by	2.52	2.18	2.35

TABLE 29.—EFFECT ON CUTTING SPEED OF VARYING THE THICKNESS OF SHAVING.

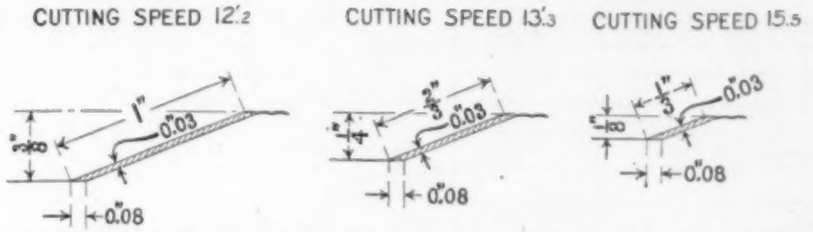


FIG. 30.—EFFECT OF LENGTH OF SHAVING ON CUTTING SPEED WHEN ELEMENTARY FORM OF STRAIGHT EDGE TOOL (FIG. 27) IS USED.

tools with a shallow depth of cut than it was with the deeper cuts.

To make it more apparent that the element affecting the cutting speed the most is the thickness of the shaving, the writer would call attention to the fact that dividing the thickness of the shaving by 3 increases the cutting speed in the ratio of 1 to 1.8, while dividing the depth of the cut by 3 only increases the cutting speed in the ratio of 1 to 1.27. From these ratios it will be seen that the thickness of the chip has about three times as great an effect in modifying the cutting speed as has the depth of the cut.

Principal Object in Having the Cutting Edge of Tools Curved is to Insure Against Damage to the Finished Surface of the Work.

The above experiments upon the effect of thickness of shaving on cutting speed enable us to explain from the theoretical standpoint the well known fact that each properly designed roughing tool should have the line or contour of its cutting edge curved as it approaches the extreme nose of the tool or that portion of the tool which insures a good and true finish of the work. A tool whose cutting edge forms a curved line of necessity removes a shaving which varies in its thickness at all parts. The only type of tool which can remove a shaving of uniform thickness is one with a straight line cutting edge. The object in having the line of the cutting edge of a roughing tool curved as that part of the cutting edge which does the finishing is approached, is to thin down the shaving at this point to such an extent as will insure the finishing part of the tool remaining sharp and uninjured even although the main portion of the cutting edge may have been ruined through overheating or from some other cause.

The effect of a curved cutting edge upon the thickness of the shaving will be seen by inspecting Fig. 35, in connection with Figs. 28, 29, 14, and 15.

Fig. 35 is a view of the curved cutting edge of a tool enlarged to 8 times its full size; thus at points 0.005, 0.01, 0.02, and 0.04 inch on this curve, the shaving is enlarged in each case so as to be respectively just 8 times as thick as the shavings shown in Fig. 28, shavings 0.005, 0.01, 0.02, and 0.04 inch. It will be observed that the quality and accuracy of the finish left upon the work will depend upon maintaining sharp and uninjured throughout the cut that portion of the cutting edge of the tool which extends, say, from about point 0.005 inch to point 0.02 inch.

By examining the standard cutting speeds noted opposite each of the straight-edge shavings, Fig. 28, it will be seen that the standard or ruining speed at point 0.04 inch, for instance, on the curve of our enlarged tool, is 13 feet. From this it is evident, then, that if the tool enlarged in Fig. 34 were run at a cutting speed of 13 feet per minute so as to just ruin it at point 0.04 inch, the tool at point 0.01 inch would then be running at less than one-half of the cutting speed which would be required to ruin it. It would be, therefore, well within its safe limit of cutting speed, and would remain sharp and uninjured until the edge at 0.04 inch had entirely broken down. It is obvious then that a curved line cutting edge insures the finishing part of the tool from damage and for this reason the cutting edges of all tools should be curved, at least as that portion of the edge of the tool is approached which leaves the work of the proper size and with the proper finish.

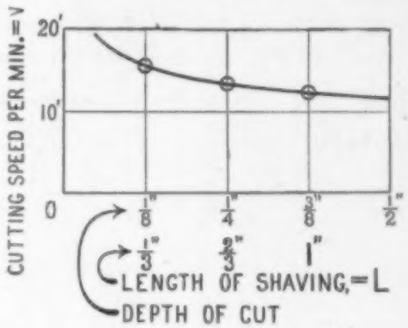


FIG. 32.—CUTTING SPEED PLOTTED ON CROSS-SECTION PAPER.

THICKNESS OF SHAVING IN INCHES	DEPTH OF CUT IN INCHES	LENGTH OF SHAVING IN INCHES	CUTTING SPEED, IN FEET	
			FROM EXPERIMENTS	BY FORMULA $V = \frac{12'.2}{L^{\frac{1}{12}}}$
0.03	1/8	1/3	15.5	15.5
	1/4	2/3	13.33	13.3
	3/8	1	12.25	12.2
	1/2	1 1/3		11.5

If we have the cutting speed for a shaving of a given length, we find the cutting speed for a shaving of:

2 times the given length by multiplying by	0.86
3 times the given length by multiplying by	0.79
4 times the given length by multiplying by	0.74
1/2 the given length by multiplying by	1.16
1/3 the given length by multiplying by	1.27
1/4 the given length by multiplying by	1.35

TABLE 31.—CUTTING SPEED CORRESPONDING TO THREE DEPTHS OF CUT.

Tools With Broad Noses Having for Their Cutting Edges Curves of Large Radius Best to Use Except for Risk of Chatter.

Upon appreciating the increase in the cutting speed obtained through thinning down the shaving, as shown in our experiments with straight cutting edge tools, described the tools shown in Figs. 35, 36, and 37, were made, and used on roughing work for years in the axle lathes of the Midvale Steel Co. The gain in cutting speed of these standard broad nosed tools over our standard round nosed tool, as shown in Figs. 20 and 21, is in the ratio of 1.30:1. This general shape of tool continues to be extensively used, but it is subject to the disadvantage that it is likely to cause the work to chatter, and so leave a more or less irregular finish.

Were it not for this difficulty, added

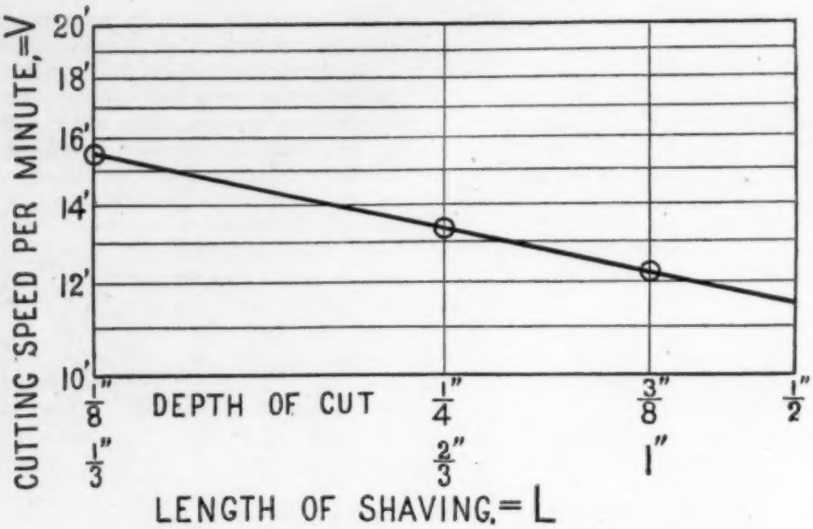


FIG. 33.—CUTTING SPEED PLOTTED ON LOGARITHMIC PAPER.

Straight line represents formula $V=12.2\div L^{\frac{1}{3}}$

to the fact that our standard round nosed tool has a greater all-round adaptability and convenience, the tools illustrated on Figs. 35 to 37, would undoubtedly be the proper shapes for a shop standard. This matter will be further discussed and a method described of using two or more broad nosed tools so as to be free from danger of chatter even upon work which is especially liable to chatter.

Reasons Why Cutting Edge With Comparatively Small Radius of Curvature Tends to Avoid Chatter.

The avoidance of chatter in the tool plays such an important part in the design of the curve of the cutting edge for standard shop tools that we quote in full from that portion of Dr. Nicolson's admirable experiments which appears to the writer to offer an explanation for one of the important causes for chatter.

Dr. Nicolson's experiments, which were made with special apparatus (of his own design) for weighing the pressure of the chip upon the tool, were described in his paper[1], as follows:

> The experiments are of special interest in regard to: First, the variation of the cutting force as the cut progresses at a very low speed; second, the variation of the cutting stresses with large ranges of speed variation.
>
> These experiments were made with a tool having a 55 degree cutting and a 67½ degree plan angle; a cut 3/16 inch deep by 1/4 inch wide being taken.
>
> For two experiments lathe was turned round at a cutting speed of about 1 foot in 5 hours, by means of a wire rope made fast round the large cone pulley, and hauled upon by a man operating a winch. A pointer about 5 feet long was clamped upon the forging, and the four dynamometer gages were read at every half an inch of motion of the end of this pointer, i. e., at about six one-hundredths (0.0625) of an inch of the cut. The vertical force varies from 9080 to 8920 every 3/16 of an inch of motion of the tool, the same wave length characterizing the variation of the surface and traversing forces. The observations have been plotted (Fig. 39, present paper) on a base of actual relative tool motion.
>
> A similar experiment carried out with the first dynamometer, is shown in Fig. 341. (See Fig. 40, present paper.) Here the cut was heavier, 3/16 inch by 1/4 inch and the tool had a 45 degree plan, and 60 degree cutting angle. The wave length of the force-curve is about 0.6 inch for this experiment, and it varies between 13,000 and 8,000 pounds. It will be observed that the force attains a maximum soon after the cutting commences to crack or shear across, and that it drops to a minimum when the small piece of cutting falls off the forging. At such a slow speed as this the cutting has time to shear off right across in separate fragments, whereas it forms a continuous curl of considerable regidity when the cutting speed is higher than a few feet per minute. These fragments measured, in this experiment, about 1/4 inch across the widest part of their surface next the top of the tool in the direction of motion.

[1]Transactions A. S. M. E., Vol. XXV, pp 672-674.

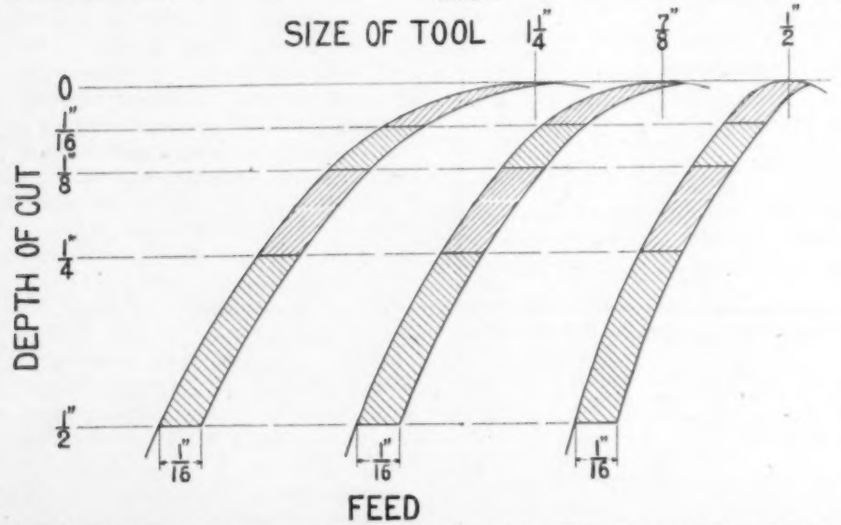


FIG. 34.—SHAPE OF CHIP CUT BY STANDARD ROUND NOSE TOOL, ENLARGED FOUR TIMES.

In these experiments Dr. Nicolson cuts the metal at a speed of one foot in five hours. By referring to Fig 40, it will be seen that the pressure on the tool increases and diminishes in the ratio of about 8 to 13 at comparatively regular wave-like intervals, and by comparing this diagram with Fig. 39 in which a thickness of feed only one-half as great is used, it will be seen that the wave lengths are in this case very much shortened. From this it appears that each thickness of shaving has its own corresponding wave length for the periods of maximum and minimum pressure on the tool.

Since the thickness of the shaving is uniform with straight edge tools, it is evident that the period of high pressure will arrive at all points along the cutting edge of this tool at the same instant and will be followed an instant later by a corresponding period of low pressure; and that when these periods of maximum and minimum pressure approximately correspond to or synchronize with the natural periods of vibration either in the forging, the tool, the tool support, or in any part of the driving mechanism of the machine, there will be a resultant chatter in the work. On the other hand, in the case of tools with curved cutting edges, the thickness of the shaving varies at all points along the cutting edge, as we have already pointed out. From this fact, coupled with Dr. Nicolson's experiments, it is obvious that when the highest pressure corresponding to one thickness of shaving along a curved cutting edge is reached, the lowest pressure which corresponds to another thickness of shaving at another part of the cutting edge is likely to occur at about the same time, and that therefore variations up and down in pressure at different parts of the curve will balance or compensate one for the other. It is evident, moreover, that at no period of time can the wave of high pressure or low pressure extend along the whole length of the curved cutting edge.

Dr. Nicolson's experiments afford us a much needed theoretical explana-

tion of what has for years been a well recognized fact, namely, that tools with straight cutting edges are much more likely to chatter than those with curved edges, and if Dr. Nicolson's apparatus and experiments had given no further information than this, they would be well worth all of the trouble and time expended upon them.

Reasons for Adopting the Particular Curves Chosen for the Cutting Edges of our Standard Tools.

Having explained the necessity for curved cutting edges in standard roughing tools, it is desirable to give our reasons for the adoption of the particular curves of our standard tools, illustarted in Figs. 16-26, and Fig. 35. It will be noted that as the body of the tool becomes smaller, the radii of curvature of the cutting edge also becomes correspondingly smaller. This change in the curve of the cutting edge is rendered necessary by the fact that the smaller tools are used in the small lathes, which, generally speaking, work upon small forgings, from which cuts are removed which are both shallow in depth and have comparatively fine feeds. Forgings which are small in diameter are quite as liable to chatter as the larger forgings which are machined in larger lathes, and in order to avoid this chatter, it is necessary that a curve for the cutting edge should be chosen which will give a variation relatively in the thickness of shaving even in small depths of cut. Thus, for the avoidance of chatter, the curve of the cutting edge should be small in proportion as the depth of cut and feed which it normally takes are small.

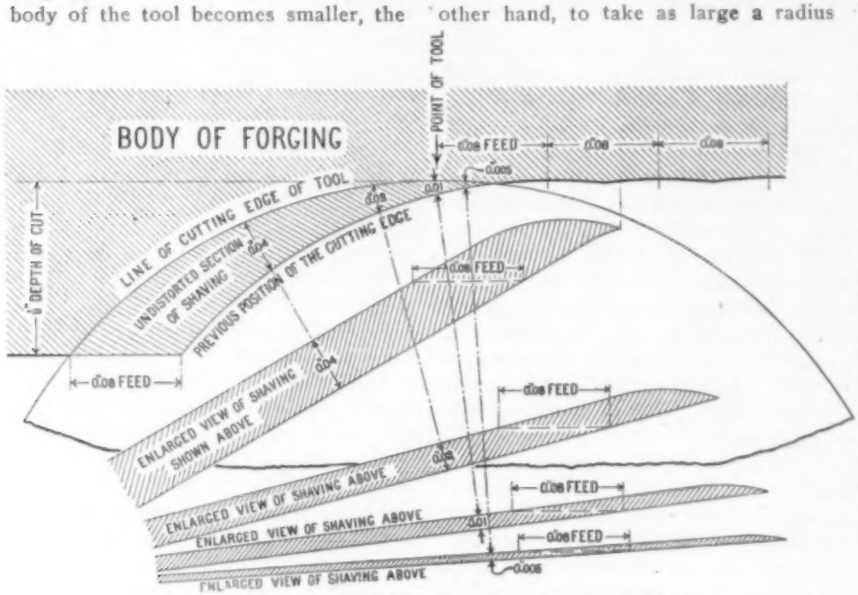


FIG. 35.—USE OF ROUND NOSE TOOLS FOR ROUGHING WORK.

Shows that with curved cutting edge, thickness of chip varies at all points and is thinner as it approaches nose of tool; a round nose tool insures against injury to work, even though it be ruined under cut.

As will be seen later, the smaller radius of curvature of the cutting edge involves a diminution in cutting speed. Therefore, with larger sized tools it becomes important, on the other hand, to take as large a radius of curvature for the cutting edge as is compatible with freedom from chatter. The coarser feed which usually accompanies the larger tool also calls for a larger radius of curvature at the nose of the tool, in order that the ridges left by the spiral path of the tool along the forging shall be as low as practicable.

The all-round adaptability of the standard tool to a variety of uses also calls for a smaller radius of curvature the smaller the tool, since standard roughing tools are continually required to run up against a shoulder or into a corner on the work, and the fillet of this corner is normally small in proportion as the forging or casting is small.

Generally speaking, also round nosed roughing tools of the type shown do not require the special care in adjusting in the tool post that would be demanded of tools designed with a straight line cutting edge for the purpose of producing a smooth finish, etc. By comparing curves of the tools, Fig. 18, it will be observed that tools which are to be used for cutting hard steel and cast iron have slightly larger radii of curvature than those which are to be used for the softer steel and wrought iron. The reason for this change is that much slower cutting speeds must be used in cutting hard steels than for soft, and this is also to a less degree true for cast iron as compared with soft steel.

It is a matter of common experience that the slower the cutting speed, the less the liability of the tool to chatter. It therefore becomes safe from the standpoint of chatter to use in cutting hard steel and also cast iron a larger radius of curvature than would be permissible in cutting soft steel. The fact has already been pointed out that the larger the radius of curvature, the thinner the shaving, and therefore the higher the cutting speed, and in the interest of economy, it is of course particularly desirable

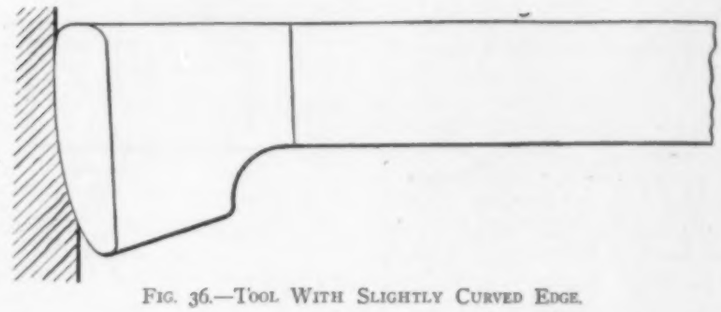


FIG. 36.—TOOL WITH SLIGHTLY CURVED EDGE.

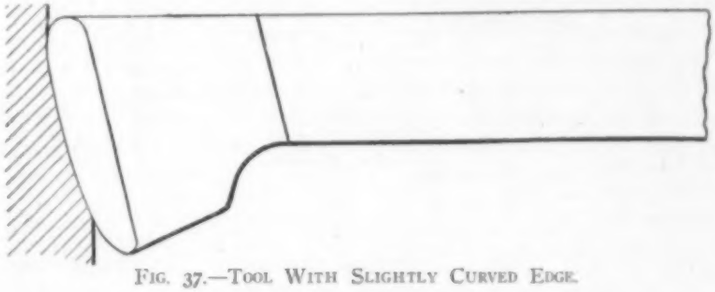


FIG. 37.—TOOL WITH SLIGHTLY CURVED EDGE.

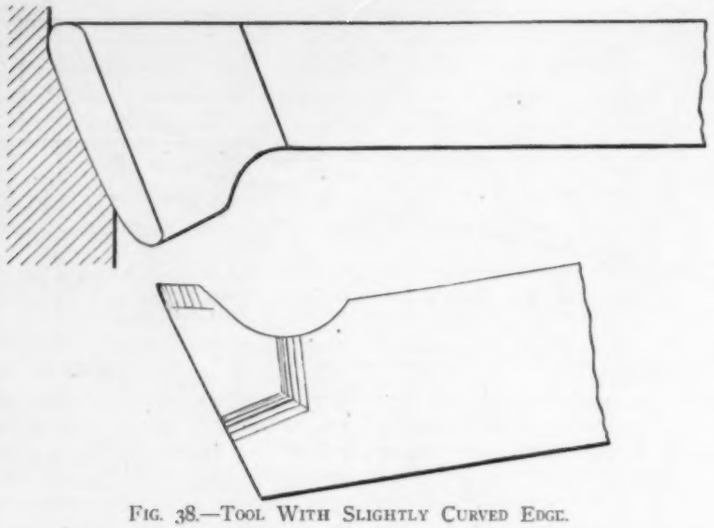


FIG. 38.—TOOL WITH SLIGHTLY CURVED EDGE.

in cutting hard steels to increase the necessarily slow cutting speed as much as practicable.

For the following entirely different reason, also, the radius of curvature for tools to be used in cutting cast iron is made larger than in tools to be used in cutting soft steel. Cast iron is cut, as will be seen later, with less cutting pressure or resistance to the tool than is required for soft steel. Therefore, in a given lathe a greater depth of cut and coarser feed can be taken on cast iron than on soft steel; and, as explained above, the coarser the feed, the greater should be the radius of curvature of the extreme nose of the tool in order to leave an equally smooth finish.

In many machine shops a very considerable portion of the work consists of cuts to be taken upon pieces of cast iron; the depth of the cut being comparatively shallow and the strength and rigidity of the casting being so great that in order to use even approximately the full pulling power of the lathe or planer, etc., broad feeds must be taken. In our standard shop tools, as illustrated in Fig. 18, the extreme end of the noses are rounded with too small radii to take a very broad feed, and yet at the same time leave a reasonably smooth finish. It is therefore desirable in all such shops to have standard tools available which are especially designed for work of this character.

In Fig. 19 is illustrated a single size of this type of tool which we recommend for this purpose. It will be observed that in form it corresponds exactly with our standard tools for cutting cast iron and hard steel except that the extreme nose of the tool is widened out so as to have a curve of very large radius, approximating to a straight line.

ASKS HEAVY DAMAGES.

The statement of claim in the action for damages for breach of contract brought by the Dominion Iron & Steel Co., of Sydney, N. S., against the Dominion Coal Co., has been filed at Montreal. Damages of $400,000 are claimed for damage to the coke ovens and furnaces, loss of profits and increased cost of production owing to the failure of the coal company to carry out its contract to supply coal up to Nov. 30, last. The sum of $68,580 is demanded for the increased price of coal purchased by the steel company from other sources, and in addition the plaintiffs ask that the value of the 90-year contract to the steel company should be assessed at $15,000,000, and the coal company held liable for that amount. The case will be one of the most important civil suits ever submitted to a Canadian court.

The ore freighter M. Andrews, named after M. Andrews, of the firm of M. A. Hanna & Co., was launched in the Cleveland yard of the American Ship Building Co., for Henry Steinbrenner, of Cleveland, O., Jan. 5. The boat is a duplicate of the Dan R. Hanna, built last year for Capt. Charles L. Hutchinson, of Cleveland, and is 552 feet over all, 532 feet keel, 56 feet beam and 32 feet deep. She will carry 10,000 gross tons on 19-foot draught.

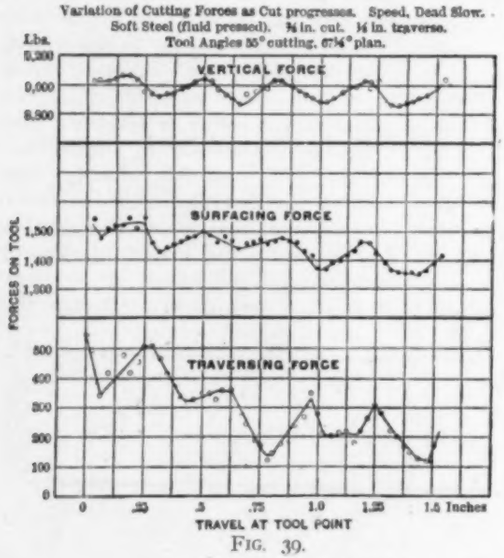

Variation of Cutting Forces as Cut progresses. Speed, Dead Slow.
Soft Steel (fluid pressed). ¾ in. cut. ¼ in. traverse.
Tool Angles 55° cutting, 67½° plan.
Lbs.
VERTICAL FORCE
SURFACING FORCE
TRAVERSING FORCE
FORCES ON TOOL
TRAVEL AT TOOL POINT
Inches

FIG. 39.

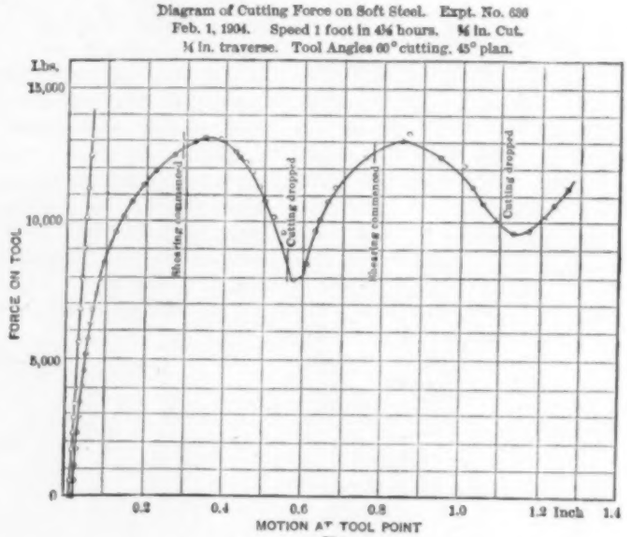


Diagram of Cutting Force on Soft Steel. Expt. No. 636
Feb. 1, 1904. Speed 1 foot in 4½ hours. ⅛ in. Cut.
¼ in. traverse. Tool Angles 60° cutting, 45° plan.
Lbs.
FORCE ON TOOL
MOTION AT TOOL POINT
Inch

FIG. 40.

From Dr. Nicolson's experiments. Tool traveled one foot in five hours; observations were made every 0.00625 inch of cut.

FIG. 39.—VARIATION OF VERTICAL PRESSURE OF CHIP ON TOOL AND OUTWARD (SURFACING) AND FEEDING (TRAVERSING) PRESSURES. FIG. 40.—VARIATION OF PRESSURE OF CHIP ON TOOL AS IT IS CUT OR TORN AWAY FROM THE FORGING.

RAILROAD PROBLEMS

DISCUSSED BY THE SOUTHERN'S NEW PRESIDENT.

Increased Cost of Equipment and Operation.—Penalties Objected to.—Other News from the Railway World.

The railroad's side of the present problem of more ample transportation facilities, particularly in the south, and of other traffic problems now in prominence is presented in a statement issued during the week by W. W. Finley, recently chosen president of the Southern Railway Co. The statement is of additional interest because of the table it carries, showing the increase in the cost of various items of railway supplies and of other lines of expense.

"One of the greatest needs of the south," said Mr. Finley, "is that its railroads should have additional track capacity. No matter how many locomotives and cars may be available, it is manifest that the number which can be moved is limited by the track capacity. The work of providing the necessary additional track will require a vast input of capital. How it is to be provided is everywhere a matter of grave concern to railroad managers. It cannot be obtained from the current operations of the properties. It must be borrowed.

"Looking forward to the need for largely increased facilities, the management last spring authorized the creation of the company's development and general mortgage bonds to the amount of $200,000,000. Of these bonds, $20,000,000 were at once sold and the proceeds are being spent as rapidly as the work can be done in adding to the existing facilities of the company. It is the intention of the management to pursue this policy and provide such of these additional facilities as may be required to meet the growing demands of business.

"As bearing upon the capacity of the railroad companies to obtain the means to make necessary additions to their facilities and to provide the most approved safety appliances in operation, the public should give fair business consideration to the situation which confronts the carriers.

"The present situation is: An immense increase in all expenses, without any increase in rates—in fact, with the proposition almost universally made of decrease rates by legislative action. The large increase in expenses may be illustrated as follows:

Bridge timber from $9.36 to $20.52 per thousand feet.

Cross ties from 28 cents to 34.5 cents per tie.

Steel rails from $17.75 per ton to $28 per ton.

Locomotives from $11,392 to from $16,000 to $20,000.

Passenger coaches from $6,315 to $9,468.

Freight cars from $500.43 to $765.

Coal cars from $368 to $1,135.

The cost of labor has increased per mile of road from $1,621.67 in 1895 and $2,513.64 in 1905 to $2,874.71 in 1906.

Taxes of the company per mile of road have, since 1895, increased 63.41 per cent.

"To this large increase of expense must be added the excessive verdicts of juries in personal injury cases. In addition to this there is a marked tendency on the part of many of the states to regard any failure of service as willful, and to impose upon the carrier a heavy penalty therefor.

"The imposition of penalties will not build railroad tracks, supply equipment, or enlarge and simplify terminals, nor would it, under the circumstances mentioned, benefit the transportation service as a whole, but, on the contrary, would tend to produce injustice and discriminations between persons and localities. Besides, this naturally would develop into a preference in favor of state commerce over interstate commerce. But the larger interests of the shipping public of the south are in interstate commerce, for the reason that their principal markets are the larger markets of the country, which are in other states.

"It is not to be wondered at that the large increase in the cost of materials, equipment and labor and other expenses above adverted to, and the increased difficulties in transportation, are, as shown by its published reports, reflected in a large decrease of the net earnings of the company since July 1, 1906, in spite of its increased gross earnings.

"With these greatly increased expenses for material, for labor, for taxes, for penalties and for damage claims, and with the just demands of the public for better facilities and greater safety of operation, it must be apparent that a reduction of revenue must conflict with the public interest in these larger questions of better facilities and greater safety."

Increased Trackage Necessary.

James J. Hill, president of the Great Northern railroad, in a letter to Governor Johnson, of Minnesota is quoted as saying that the present congestion of freight traffic throughout the United States is due to lack of trackage. Mr. Hill recites the figures of the interstate commerce commission to show that the trackage of the United States in 10 years has increased 21 per cent, freight cars 45 per cent and freight tonnage 118 per cent. He declares the railroads have met the traffic by providing increased equipment which is entirely adequate to carry the business if there were sufficient tracks. Mr. Hill says that the best judgment of many conservative railroad men in the country is that an immediate addition of not less than five per cent per annum to the railroad trackage of the country, for five years, should be made. This raises a big problem. At 140 tons to the mile, Mr. Hill figures, it would require 2,000,000 tons of steel rails every year to furnish the 11,500 miles of track required, or two-thirds of the product of all rolling mills in the United States. This work would call for the labor of 200,000 men in grading, besides track layers, bridge builders and others, and he doubts if labor is to be had in sufficient quantities on any terms to carry out this construction.

Wages are Increased.

Western railroads at a meeting in Chicago, Jan. 11, decided to grant increased wages to engineers aggregating between $5,000,000 and $6,000,000 annually and affecting about 18,000 engineers on all roads west of Chicago. On passenger locomotives the men will receive a five-cent increase on a 100-mile run. On freight the increase will range between 8 and 12 cents per 100-mile run. In all the larger freight yards the switch engineers will receive an addition of between 50 to 75 cents a day of 12 hours.

More Steel Cars Needed.

Steam railroads in New York state during the fiscal year ending with June 30, last, earned gross $378,480,740, as against $348,813,233 the year previous. Operating expenses were heavier, however, to the extent of over $14,000,000, making the net receipts for the year about $16,000,000 more than in the year ending June 30, 1905. Since 1898 the state has spent more than $1,000,000 in the elimination of grade crossings, aiding in the removal of 174. Massachusetts in sixteen years has expended more than $10,000,000 in this work, and the board of railway commissioners of New York urges a more extensive campaign of this kind in the latter state. The board further recommends that all out-of-date passenger coaches be replaced as soon as practicable. The proportion of steel passenger cars in use is given as 17 per cent, and it is urged that they be installed exclusively and at an early date on those

railroads whose financial condition will permit. Another recommendation to the legislature is that all motor cars should be equipped with power brakes.

Complains of Error.

Omission of the words "bridge material" by the western classification committee, when it fixed the transportation rates for railroad material at its last meeting, has caused the Wisconsin Bridge & Iron Co., of Milwaukee, to file a complaint with the interstate commerce commission against the Chicago, Milwaukee & St. Paul railroad. The complaint alleges that the railroad has unjustly raised the rate from 12½ cents to 27 cents per 100 pounds on iron bridge material, in carloads, between Milwaukee and Kansas City. It is probable that the contention will have a quick adjustment by the interstate commerce commission remedying the error.

Testing Steel Ties.

An experiment to test the advisability of steel cross ties as a substitute for wood ties is being made by the Pennsylvania railroad on its main line between Pittsburg and Altoona, Pa., where more than 3,000 of the metal cross ties have been installed. The increasing difficulty to secure a sufficient number of cedar ties is given as the cause for the experiment. It is estimated that American railroads use annually 110,000,000 new ties, of which the Pennsylvania system requires 5,500,000.

Railroad Notes.

Fifteen hundred men in the Chicago & Alton shops, Bloomington, Ill., have received notice of a 10 per cent increase in pay.

Directors of the Baltimore & Ohio railroad have declared a regular semi-annual dividend of two per cent on the preferred stock and three per cent on the common stock.

The Philadelphia & Reading railroad has plans completed for the new shops to be erected at Rutherford, Pa., which will include machine shop, blacksmith shop and other departments necessary for general repair work.

The shipments of coal and coke on the Pennsylvania lines east of Pittsburg and Erie, for the year 1906, aggregated 49,711,088 tons, an increase over the previous year of more than 3,000,000 tons. For the week ending Jan. 5 the aggregate shipments were 1,070,233 tons.

The Delaware, Lackawanna & Western is to build locomotive shops in Scranton, Pa., to cost about $2,000,000, on the site of the old North Mills occupied by the Lackawanna Iron & Steel Co. When completed the plant will employ about 5,000 men.

The railroad rate committee of the Columbus, O., board of trade is considering the formation of a traffic association for the protection of shippers of all classes. The plan is to employ expert freight and traffic men to look after the interests of the shippers in railroad rate matters.

At the annual meeting of the stockholders of the Little Miami railway, which is leased to the P., C., C. & St. L. for operation, to be held in Columbus, Jan. 29, a proposition to increase the capital stock of the company from $8,000,000 to $10,000,000 for extensive improvements will be voted on.

To provide for the future growth of the shops and yards at Topeka, Kas., the Santa Fe has just acquired a tract of 24 acres of ground. C. A. Morse, chief engineer of the line, says the purchase is part of an expansive scheme by which Topeka is to be the shop center of the Santa Fe.

The American Car & Foundry Co. received an order form the Delaware & Hudson Railroad Co. for 1,500 steel underframe cars, 1,500 steel underframe hopper cars and 1,500 steel coal side cars. The National railroad of Mexico has also ordered 1,000 box cars and the Rock Island 1,000 steel cars.

A junction and a new town are to be established at Mifflin township, two miles from Homestead, Pa., where the Wabash railroad connects with the Monongahela Southern railroad, and at which point tonnage from the Edgar Thomson, Homestead and Duquesne steel works will be delivered to the Wabash.

The foundations for the new Grand Trunk car shops at Battle Creek, Mich., have been completed. Other work to be done on the shops this winter will be the laying of a cement floor eight inches thick and 175 x 824 feet in dimensions for the main building, which will be one of the largest continuous cement floors in Michigan.

The Pennsylvania railroad has a large force of men out hunting on other railroad systems for its freight cars which have been long overdue in returning. This step was taken by the company when a recent statement showed that out of its total equipment of 221,810 cars, 72,010 were on foreign roads at that time.

The Norfolk & Western railroad has placed 100 men at work grading and laying a second track on its main line between Main street, Columbus, O., and Valley Crossing. Plans are being prepared by the company for the erection of a repair shop and a passenger and freight station at the Livingstone avenue crossing in Columbus.

FURNACE MEN PROTEST.

Blast furnace men from Ironton, Portsmouth and other points in the Ohio valley have filed a cross complaint with the Ohio railroad commission in connection with the fight being waged by the Ohio Shippers' Association against the 48-hour unloading rule put into effect in December by 52 railroads in Ohio. The furnace men at first did not expect the rule would apply to coke and ore shipments, and they paid no attention to the announcement until statements for heavy demurrage charges were presented the first of the year. Then they applied to the Ohio railroad commission to file a cross complaint. This was objected to by the railroads, but they were overruled and the commission fixed Feb. 26 for taking testimony of the furnace men. The cross complaint says that the furnace men are in a class by themselves and should be provided with special rules to fit their cases, for the reason that their shipments of coke and ore are in such large quantities.

Heavy Structural Demand.—More than 8,500 tons of steel will be used from the third sub-basement to the skeleton work in the tower of the 50-story building to be erected for the Metropolitan Life Insurance Co., in New York. There is to be more than 740 feet of perpendicular continuous bridge work in the building. Chicago people dispute the statement that this is the largest single order for structural steel ever given for one building, declaring on a statement of an agent of the Cambria Steel Co. that the new Cook county building being erected there will contain practically 11,000 tons of steel.

Foundrymen Banquet.—At a banquet at the Grand hotel, Jan. 10, the members of the Cincinnati Foundrymen's Association of Cincinnati, discussed trade topics. It was stated that although labor conditions were not altogether satisfactory, they are improving, and that all the shops are doing satisfactory business. A special effort is to be made by the association to keep local orders from going outside of Cincinnati.

The value of automobiles manufactured annually in Cleveland, is estimated to be a little more than $18,700,000. Upwards of 4,300 men are employed in the Cleveland shops. It is estimated that in 1907 more than 5,800 cars will be turned out by Cleveland factories.

OPEN SHOP VICTORY.

The Harris Automatic Press Co., manufacturer of printing presses, Niles, O., has been declared an open shop by the local machinists' union, following labor difficulties of nearly two years' duration. In the early part of the strike, about two years ago, the strikers and strike-breakers clashed, causing considerable excitement. The trouble settled down to a holding-out game and the new employes encountered no further molestation. The company firmly maintained its stand from the start.

Would Prevent Strikes.

Hon. Rudolph Lemieux, minister of labor, has introduced into the Dominion House of Commons a bill for the prevention and settlement of strikes and lockouts under the title of "The Industrial Disputes and Investigation Act." The measure applies to difficulties in all mines, or public service utilities including railways, both steam and electric, steamships, telegraph and telephone lines, gas, electric light, water and power works. It also contains a provision whereby a dispute in any industry or trade may be by consent of the parties brought within the provisions of the act. The bill makes it illegal for employers to declare a walk-out because any of their employes are or may become members of labor organizations, and for employes to strike because employers employ non-unionists. The bill provides for the establisment of boards of conciliation and investigation to deal with any dispute arising which cannot be settled without recourse to a strike or lockout. Two members are to be appointed on the recommendation of the parties to the dispute, and the third either by these two, or by the Minister of Labor, should they fail to agree. The boards are given the power of a court as regards the hearing of evidence, and are to do all in their power to effect a settlement. If they fail in this they are to report fully as to the causes and nature of the dispute and make recommendations as to a fair and equitable basis of settlement. It is made illegal for employers to lock out their men, or for employes to go on strike until disputes have been referred to the board and fully investigated. After the investigation has been held and the board has reported its recommendations, the parties are free either to accept or reject its findings. In the event of both parties agreeing to be bound by the recommendations of the board, the findings of the board shall bind the parties as though they were the rule of a court.

Mine Workers Weakening.

Reports presented at the annual meeting of the United Mine Workers of America, now being held at Indianapolis, indicate heavy loss of strength in that line of union activity. President Mitchell, at the opening of the convention called attention to the fact that there had been a decrease of 32,220 in membership in the anthracite field during the year and demanded that organization methods be redoubled. It developed that only about half the local unions had paid the extra strike assessment of fifty cents a week, but the delinquents were seated. Vice President Lewis, who followed Mr. Mitchell, declared that the granting of permission for the signing of wage scales by districts and locally has cost the organization 50,000 members, the decrease in Pennsylvania, Maryland, Virginia and West Virginia being practically that number though more miners were now employed in those states than were a year ago. The report of the secretary-treasurer gave the total paid-up membership in November, 1906, as 256,212. The average for the year was 34,283 less than in 1905.

Labor Notes.

The Lehigh Valley railroad has increased the pay of all classes of labor from one to four cents an hour in its shops at Easton, Pa., affecting 600 men.

A strike has been caused at the East Chicago plant Republic Iron & Steel Co., because the bushelman refused to work a certain mixture of the scrap. Nearly 1,500 men are affected.

Tinworkers employed by the American Sheet & Tin Plate Co., a subsidiary concern of the United States Steel Corporation, have been given a two per cent advance in wages, effective at once. About 5,000 men are affected.

W. D. Foster, foreman of the Pittsburg Steel Construction Co., who came to Ashtabula, O., with a crew of non-union structural ironworkers, to erect dock machinery for the Pennsylvania Railroad Co., was shot from ambush and is now in a hospital.

Four hundred employes of the Western Tin & Iron Co., of Greencastle, Pa., have decided not to accept the 20 per cent reduction in wages announced by officials, who declared that the plant was working under too many disadvantages to continue operating under the old scale.

A strike affecting about 400 boilermakers, members of the Brotherhood of Boilermakers and Iron Ship Builders of America, at Youngstown, O., Niles, O., and New Castle, Pa., was called Jan. 15. A general increase in wages, shorter hours and recognition of the union are among the demands of the workmen.

Seven hundred men employed in the tube mills of the Wheeling Steel & Iron Works, at Benwood, W. Va., went on strike Jan. 10 because of a refusal of the management to abolish the three-week pay-day plan. Supt. Williams, of the tube mill, is quoted as saying that to abolish the three-week pays is an utter impossibility and that President Hubbard had offered the men an increase of 10 per cent if they would return to work under the old system.

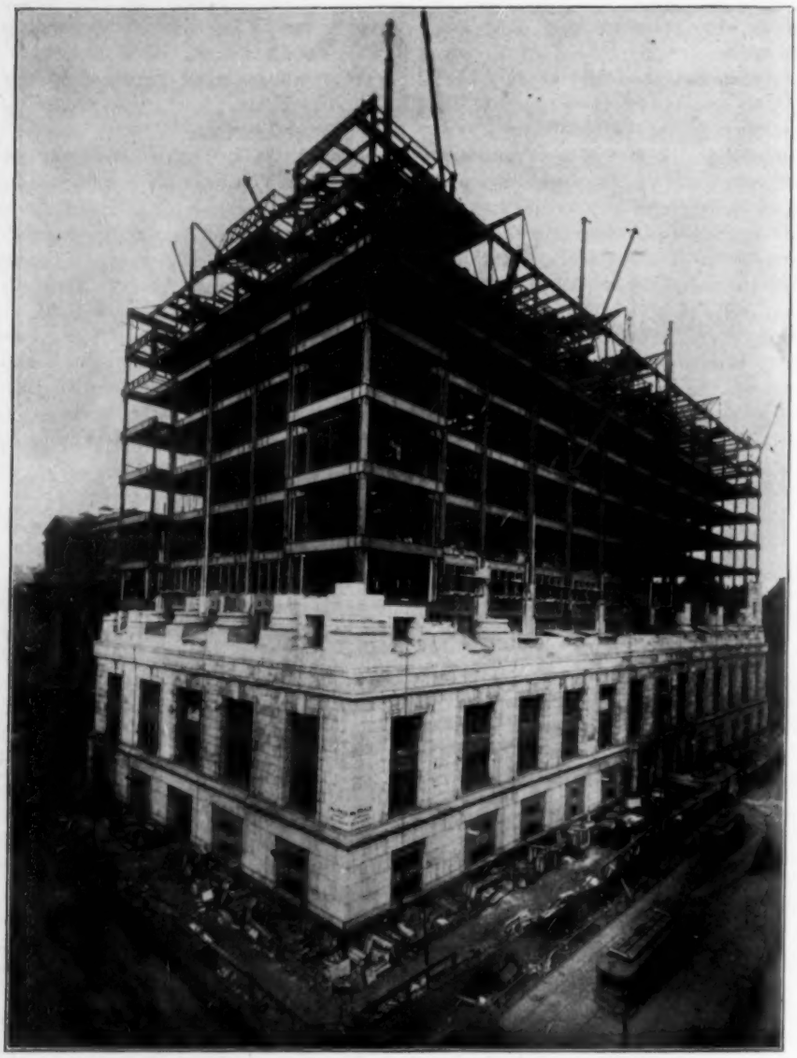
William J. Fairbairn, secretary of the Metal Trades and Foundrymen's Association, is quoted as saying that there are more molders now employed in Milwaukee, Wis., machine shops than there were at the time of the strike last May, and that there is no change in the situation as far as the Foundrymen's Association is concerned. Secretary Fairbairn states that at the time of the strike 1,325 molders were employed, as compared with 1,341 employed today.

A New Carnegie Grant.—The Carnegie Institution of Washington, D. C., has made a grant of $3,000 a year for a period of four year to Dean W. F. M. Goss, of Purdue University, Lafayette, Ind., for the purpose of determining the value of superheated steam in locomotive service; first, in connection with single expansion engines, and second, in connection with compound engines. This is the second grant which the Institution has made to Dean Goss. While given to him personally, its effect will be to stimulate and to make more effective the work of the Purdue locomotive laboratory. Funds thus received will be employed in supplementing the resources of the laboratory as derived from all other sources. The results of Dr. Goss' previous research under the auspices of the Carnegie Institution, which was for the purpose of determining the value of different steam pressures in locomotive service, are now in press.

Stephens-Adamson Mfg. Co., Aurora, Ill., entertained its employes at its fifth annual banquet at the Hotel Arthur, Aurora, Saturday evening, Jan. 5. After the dinner, speeches were made by the various executive officials and department heads on subjects pertaining to their respective duties. F. G. Adamson acted as toastmaster.

USE OF PLATES IN NEW COOK COUNTY COURT HOUSE.

In addition to the 6,900 tons of structural shapes which entered into the construction of the steel frame of the Cook county court house, Chicago, 3,800 tons of plates were used in the fabrication of the girders and for reinforcing the columns. While the use of steel plates for building members has been growing in recent years, their application in this structure was more extensive than in any of the large office buildings erected in late years. The plate tonnage equaled that of the beams and channels combined and exceeded by 700 tons that of the angles, zees and tees.



THE COOK COUNTY COURT HOUSE UNDER CONSTRUCTION.

Forty plate girders, riveted to columns 2 feet, 6 inches wide, which weighed from 22 to 26 tons and varied in length from 26 to 40 feet and 13 feet deep, were required as supports for granite columns which extended from the fourth floor. This floor, on account of its construction, will be used as a vault for the storage of records and contains no windows. Two of the columns were also of unusual size, having weighed 18 tons each, and were 40 feet, 8¼ inches long.

The steel was furnished by the Cambria Steel Co., Johnstown, Pa., the contract having been awarded March 1, 1906, the first steel set June 12, and on November 12 the roof columns were in place. From the mining of the ore to the shipment of the fabricated material, this company controlled each successive step of the manufacture. The ore was shipped to lower lake ports in the company's boats and transported to Johnstown in steel cars built in its own car shops, while shipments to Chicago were made over the Pennsylvania railroad, with which the Cambria company is closely allied.

This court house is the largest county building in the United States and the steel contract was the largest for office building construction ever awarded in Chicago. The building has a floor plan of 374 × 157 feet and a height of 218 feet, contains 12,000 cubic feet of space, and was constructed at a cost of 35 cents a cubic foot. The sub-basement is 40 feet below the street, on a level with the freight tunnel which connects all of the principal buildings with the railroad freight stations, so that the hauling of all fuel and refuse on the street surfaces will be entirely eliminated. Each of the 130 foundation columns rests on a concrete pier, varying in diameter from 9 to 12 feet and extending to bed rock 110 feet below the street level. The excavation for these piers was started Jan. 18 and completed May 15, 1906. These piers contain 33,000 tons of concrete. This is the fourth court house erected in Cook county, the first having been built in 1835, the second in 1851 (which was subsequently destroyed by fire in 1871), and the third in 1877, which was razed to make room for the present structure.

BRITISH PIG IRON MARKET.

Many Inquiries from America and Germany.—Prices Steady.

Office of THE IRON TRADE REVIEW.
Prince's Chambers, Corporation Street,
Birmingham, Eng., Jan. 8.

The British pig iron market is steady, with a slightly upward tendency. There has been a little fall since mid-December, when the highest figures of £3 3s 6d ($15.54) for Cleveland was reached. The year closed at £3 2s 9d ($15.36.) Makers are now asking £3 3s 0d ($15.42) for the first half of 1907, and £3 4s 0d. ($15.66) for the second half. Inquiries are still numerous from America and Germany, but buying is not quite so brisk as present figures are considered rather high. The year closed with prices about 8 shillings better than those of a year ago. South Staffordshire smelters have orders to last them through March, cinder being £2 17s 6d ($14.08), foundry £3 ($14.68), part mine £3, foundry £3 5s ($15.90,) Northampton £3 to £3 2s 6d ($15.30), Derbyshire £3, foundry £3 2s 6d. Since the end of last week, there has been a fall in Cleveland iron owing to a big Glasgow failure, the minimum reached being £3 0s 3d ($14.74.) On Monday it was £3 1s 0d ($14.92) all day. Public stores at Glasgow and Middlesboro continue steadily to reduce. The general appearances seem to point to the probability of a big business at the quarterly meeting on Thursday next.

Stock Transactions are Disappointing.

With money conditions so improved as to lead to the expectation of an active and rising market, the past week in stock transactions has proved very disappointing to investors. There is a general hesitancy present among traders to believe that better money quotations are permanent and this lack of faith is believed to be responsible to a great extent for the receding market. Heavy liquidation was also a feature of the week, contributing in effect toward the fall in prices which applies to almost every listed security. The market opened firmly and after several days of dull and irregular transactions, became demoralized on Friday, prices showing a net loss of 1 to 8¼ per cent. The sentiment continued on Saturday and some of the stocks declined to the lowest of the year, but in the final dealings part of the loss was recovered. The average price of railroad stocks has fallen 8 points since Jan. 5. This decline in the market is very disappointing to those expecting the usual January rise. In January, 1906, the highest price of the year was reached and in every January except one since 1898, there has been more or less pronounced advance in prices. The easy money conditions were reflected by the action of the bank of England in reducing its discount rate to 5 per cent after it had kept it at 6 per cent for 13 weeks. Call and time money were obtainable at lower rates. The New York bank statement showed a surplus reserve which is $2,000,000 larger than a year ago. United States Steel was fairly active, 647,700 shares changing hands. Considerable trading was apparent in Colorado Fuel & Iron, the sales aggregating 52,900 shares.

Announcement has been made by the Bethlehem Steel Co., that the Bethlehem Iron first 4s will be paid off at maturity, Feb. 1. The amount of the issue is $1,351,000.

Recent dividend declarations include the Cambria Steel Co., regular semi-annual dividend of 1½ per cent, payable Feb. 15 to stock of record Jan. 31; the Bethlehem Steel Co., quarterly dividend of ¾ of 1 per cent on preferred, payable Feb. 1; Aurora Automatic Machinery Co., a subsidiary of the Independent Pneumatic Tool Co., of Chicago, regular quarterly dividend of three per cent; the Railway Equipment Corporation, regular quarterly, 1½ per cent, payable Jan. 15; International Steam Pump Co., regular quarterly, 1¾ per cent on its preferred stock, payable Feb. 1; Goodwin Car Co., quarterly dividend of 1½ per cent, payable Jan. 25; Columbus & Hocking Coal & Iron Co., regular quarterly dividend of 1½ per cent on preferred stock, payable April 1; Peerless Stove Co., 6 per cent dividend, payable in February.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo Jan. 19	Changes In Week	Date 1907 Ann. Meet.	Stock Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Pay.
Allis-Chalmers	15	−1	Sept. 5	19,820,000			
Allis-Chalmers pr	37⅝	−5⅛		16,150,000	7 cum		Feb., 1904
American Can	4⅞	−1⅛	Feb. 5	41,233,300			
Am. Can pr	51½	−3		41,233,300	7 cum	5 Q.	Jan., 1907
Am. Car and Fdy	43½	− ⅜	June 27	30,000,000		½ Q.	Jan., 1907
Am. Car and Fdy pr	101⅞	−1⅜		30,000,000	7 n. c.	7 Q.	Jan., 1907
American Loc	70⅜	−3½	Oct. 5	25,000,000		1¾	Feb., 1907
American Loc. pr	111½	+1⅜		24,100,000	7 cum	7 Q.	Jan., 1907
American Ship.	79¾	+ ¼	Oct. 2	7,600,000	6	1 Q.	Dec. 1906
American Ship. pr	110	.....		7,900,000	7 n. c.	1¾ Q.	Jan. 1907
Am. Steel Foundries	9⅜	− ⅜	Oct. 1	15,810,000			
Am. Steel Foundries pr.	45	−1		17,240,000	6 cum		Aug., 1904
Barney & Smith	72	+2	June 4	2,000,000	4	4	Dec., 1906
Barney & Smith pr	138	.....		2,500,000	8 cum	8 Q.	Dec., 1906
Bethlehem Steel	18½	−2	April 2	14,862,000			
Bethlehem Steel pr	65	.....		14,908,000	7 n. c.	2 Q.	Feb., 1907
Cambria Steel	45⅞	−1¾	Mar. 19	45,000,000*	6	3 Q.	Feb., 1907
Cambria Iron	48¾	− ⅛		8,468,000*	4	4 S. A.	Oct., 1906
Chicago Pneumatic Tool	50	.....	Feb 18	6,145,800	4	4 Q.	Jan., 1907
Colorado Fuel	51⅞	−4⅜	Oct. 21	30,132,000			Apr., 1902
Crucible Steel	10⅞	− ⅝	Oct. 16	24,578 400			
Crucible Steel pr	75⅝	−2⅜		24,436,500	7 cum	6	Dec., 1906
Empire Steel	7	.....	Feb. 27	2,281,400			
Empire Steel pr	47	.....		2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	95	.....	Feb. 19	1,000,000	6	6 Q.	Nov., 1906
Fay & Egan pr	128½			1,000,000	7 cum	7 Q.	Nov., 1906
General Electric	157⅜	+1⅛	May 14	51,356,000	8	8 Q.	Jan., 1907
Harbison-Walker	13¾	.....	Jan. 21	13,000,000	6		
Harbi on-Walker pr	79¾	.....		9,600,000	6 cum	6 Q.	Jan., 1907
International Pump	37	−3	June 4	17,762,500		2	Apr., 1905
International Pump pr.	78⅛	−1½		11,850,000	6 cum	6 Q.	Feb., 1907
Lackawanna Steel	71	.....	Mar. 13	34,971,400			
Lake Sup. Corp	14	.....	Oct. 2	40,000,000			
New York Air Brake	137	−1¾	June 18	10,000,000	8	8 Q.	Jan., 1907
Niles-Bement-Pond	130	.....	Feb. 6	5,000,000	8	6 Q.	Sept, 1906
Niles-Bement-Pond pr	105	.....		2,000,000	6 cum	6 Q.	Dec., 1906
Otis Elevator Co	50	.....	March 18	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. pr.	94	.....		6,308,500	6 n. c.	6 Q.	Jan., 1907
Penn. Steel	60	.....	May 13	10,750,000			
Penn Steel pr	103	−3		16,500,000	7 n. c.	7 S. A.	Apr., 1906
Pittsburg Coal Co	15¾	−1	Feb. 11	29,045,400			Nov.
Pittsburg Coal pr	57¼	+ ⅛		30,217,700	7		Apr., 1905
Pressed Stl Car	53⅜	−1⅞	Feb. 20	12,500,000		3	Aug., 1904
Pressed Stl. Car pr	98	−1½		12,500,000	7 n. c.	7 Q.	Nov., 1906
Pullman	170	−8½	Oct. 17	100,000,000	8	8 Q.	Oct., 1906
Railway Stl. Spring	53	−2¼	Mar 7	13,500,000		4 S. A.	Oct., 1906
Railway Stl Spring pr	98½	− ⅝		13,500,000	7 cum	7 Q.	Dec. 1906
Rep Iron & Steel	36½	−3¼	Oct. 9	27,191,000			
Rep. Iron & Steel pr	97¾	−1¼		20,416,900	7 cum	7 Q.	Jan., 1907
Sloss-Sheffield	72½	−2⅜	Mar. 5	10,000,000	5	5 S. A.	Oct., 1906
Sloss-Sheffield pr	102	.....		6,700,000	7 n. c.	7 Q.	Jan , 1907
Tenn. Coal & Iron	100	−1½	May	22,553,600	4	4 Q.	Nov., 1906
U. S. Pipe & Fdy	47	−1½	June 26	12,500,000	4	4 Q.	Dec., 1906
U. S. Pipe & Fdy. pr	87½	+ ⅛		12,500,000	7 n. c.	7 Q.	Dec., 1906
U. S. Steel	46¾	−2¾	April 15	508,302,500	2 n. c.	½ Q.	Oct., 1906
U. S. Steel pr	104¾	−1⅜		360,281,100	7 cum	7 Q.	Nov., 1906
U. S. Steel 5's	97¾	− ⅜		463,798,000	5	5 A.	
Va. Iron, Coal & Coke	88	+3½	Sept. 17	8,641,000			
Westinghouse Elec	151	+1	June 26	20,996,350*	10	10 Q.	Jan., 1907
West'ghouse Air Brake	156	−2	Oct. 1	11,000,000*		22½ Q.	Jan. 1907

Par value of shares, $100, except those starred, $50.

A circular has been issued by the Illinois Car & Equipment Co., of Chicago, Ill., asking the largest shareholders, in view of the improved condition of the company, to readjust the capital account by reducing the par value of the shares from $10 to $7.50, which will bring the share capital down to $461,400.

The United States Steel Corporation directors will meet Jan. 29 to take action on dividends. It is expected that there will not be an increase in the rate of the common stock and the April dividend will probably be at 4 per cent.

China Exports Decrease.—Iron and steel and machinery exports from the United States to China have fallen off in the past year. Various causes, including the boycott, have been assigned for the decrease. The figures show that in 1902 the iron and steel and machinery exports were $437,800, in 1904, $970,000; in 1905, $1,267,800, and in 1906, $980,000.

The bill to improve the consular service, introduced by Senator Lodge, provides that vacancies in this service above class eight shall be filled by promotion.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Geneva Foundry & Machine Co., Geneva, Ill., has increased its capital stock from $5,000 to $7,000.

The C. W. Alger Co., Inc., Boston, Mass., has been incorporated with a capital stock of $5,000, by D Russell, of Dorchester, Mass.

The Keith Car & Mfg. Co., Boston, Mass., has been organized with a capitalization of $600,000, by W. N. Akers and H. C. Cook.

The E. A. Sammons Co. New Orleans, La., has been incorporated with a capital of $30,000 by Elmer A. Sammons and Leonce M. Soniat.

The Lepage Coupling Co., Chicago, has been incorporated with a capital of $10,000 by John Kennedy, Charles E. Lepage and Frank L. Wolverton.

The Bridgeport Machine Co., Bridgeport, Ill., has been incorporated with a capital stock of $50,000 by J. D. Anderson, S. G. Lockwood and A. L. Skinner.

The Joilet Machinery Co Joliet, Ill., has been organized with a capitalization of $10,000 by John T. Mahoney, F. A. Hoover and James Walter Martin.

The Lake Erie Foundry Co., Buffalo, N. Y., has been incorporated with a capital stock of $10,000 to manufacture castings. The incorporators are: P. Keipper, A. G. Bartholomew and S. L. Brown.

The David Wigert Boiler Works, Galesburg, Ill., has been organized with a capitalization of $100,000 by David Wigert, B. F. Butler and Douglas Vaughn.

The Bay State Saw & Machinery Co., Boston, Mass., has been incorporated with a capital of $25,000 by F. H. Hall, of Ashland, and E. W. Adams, of Highlandville.

The William M. Cowan Foundry & Machine Co., Augusta, Me., has been incorporated with a capital of $150,000 by W. M. Cowan, of Lynn, Mass., and L. A. Burleigh.

The Smurr & Kamen Machine Co., Chicago, Ill., has been incorporated with a capital stock of $50,000 by Samuel P. Smurr, John F. Kamen and Edward T. McKnight.

The Girard Foundry & Machine Co., Girard, O., has been organized with a capitalization of $15,000 by T. C. Thomas, J. C. Hillenbrand, F. H. Lightle, G. J. Jones and William C. Wallis.

The Connellsville Mutual Coke Co., Connellsville, Pa., has been organized with a capitalization of $50,000 by R. B. Hays, of Masontown; John R. Byrne, of Everson, and A. P. Byrne, of Scottdale.

The St. Lawrence Saw & Steel Works Co., Ltd., Sorel, Que., has been incorporated with $40,000 capital by C. D. Pontbriand, Joseph Pontbriand, Henri M. Pontbriand, Francois D. Pontbriand and Tolentin D. Pontbriand.

The John Hassell, Inc., New York, has been organized with a capital of $120,000 to manufacture wire nails, rivets, etc. The incorporators are: John Hassell, Southfield, N. Y.; James Hassell and William W. Smith, Queens, N. Y.

The Canadian Boomer & Boschert Press Co., Ltd., Montreal, Que., capital $20,000, has been incorporated to manufacture hydraulic presses by Alfred E. C. Madley, L. de K. Stephens, W. S. Johnson, Frank Callahan and John A. Walker.

The Andrew Fyrberg & Sons Mfg. Co., Hopkinton, Mass., has been organized to manufacture steel, iron, etc. The capital stock of the new company is $40,000, and the incorporators are: Andrew Fyrberg and Anna Fyrberg, both of Hopkinton.

The Clark & Cowles Valve Co., New York, has been organized to manufacture machinery. The capital stock is $250,000, and the incorporators are: Walter G. Clark and George W. Kyburg, 135 Broadway, and R. A. Cowles, 99 John street, all of New York.

The Kaufman Machinery Co., Manhattan, N. Y., has been organized to deal in new and second-hand machinery. The capital stock of the company is $6,000, and the incorporators are: F. Knowlton, E. A. Monfort and L. Kaufman, all of the address given above.

The Double Down Draft Furnace Co., New York, has been organized with a capitalization of $100,000 to manufacture furnaces and heating apparatus. The incorporators are: Charles H. Topping and Archie W. Palmer, 15 William street, New York, and Henry J. O'Connell, Bradford, Pa.

The Jones-Julia Mfg. Co., New York, has been incorporated to manufacture tools, machinery, etc. The capital stock is $10,000, and the incorporators are: J. J. Julia, 201 West Eleventh street; William Jones, 605 West 137th street; C. E. Duncan, 332 St. Nicholas avenue, all of New York.

The Acme Foundries Co., Inc., Everett, Mass., has been organized to deal in metals, castings, etc. The capital stock of the company is $30,000, and the incorporators are: Harold W. Mason, 31 State street, Boston; William H. Montgomery, Newton, and Lennox H. Lindsay, 31 State street, Boston.

The Border Bolt & Nut Lock Co., of Richmond, Ind., has increased its capital stock from $35,000 to $75,000, and the plant of the company is being equipped with new machinery.

The Townsend & Moore Engineering Works, Brooklyn, N. Y., has been incorporated with a capital of $60,000 to build ships, boilers, etc. The incorporators are: Rudolph Townsend, 8401 Nineteenth avenue, James P. Chute, 410 Cleremont avenue, both of Brooklyn, and Harrison B. Moore Jr., Hotel Willard, New York.

The Alexander Hamill Iron Works, 426 Montgomery street, Jersey City, N. J., has been incorporated to manufacture structural and ornamental iron. The capital stock is $100,000, and the incorporators are: John F. Hamill, 95 Glenwood avenue; Alexander S Hamill and Cornelius A. Hamill, 300 Varick street, Jersey City, N. J.

The New Bedford Foundry & Machine Co., New Bedford, Mass., has been incorporated to deal in foundry pattern making and wood working. The capital stock of the company is $15,000, and the incorporators are: Edward L. Besse, of Fairhaven; Seth J. Besse, of New Bedford; A. G. Gaswell and F. D. Stetson.

The Co-operative Industrial Corporation, New York, has been incorporated to manufacture machinery, engines, etc. The capital stock of the company is $100,000, and the incorporators are: Mark Weiss, 64 East 111th street, New York; John McLaren, 203 Broadway, New York, and Charles Griffith, 1012 Lorimer street, Brooklyn.

The Berlin Construction Co., Manhattan, N. Y., has been incorporated with a capital of $500,000 to design and construct bridges, piers, docks, etc. The incorporators are: Daniel E. Bradley, Berlin court, George H. Sage, Hartford court, Seymour N. Robinson, Hartford court, Morris S. Werner, 52 Broadway, Charles J. Kelaher, 52 Broadway, of New York.

The Standard Safe & Lock Co., Des Moines, Ia., has been organized to manufacture burglar and fireproof safes, vaults, locks and similar articles. The capital stock of the company is $75,000, and the incorporators are: W. C. Hutton, F. C. Waterbury, E. W. Waterbury and E. L. Bowen. It is the intention of the company to erect a large factory and start at once upon the manufacture as outlined.

New Construction:—

Love Bros., Inc., will erect an addition to their foundry at Aurora, Ill.

The Epping Carpenter Co., Pittsburg, Pa., is erecting a steel addition to its machine shop.

The Orinskany Malleable Iron Co., Orinskany, N. Y., is erecting a large steel building to be used for patterns.

The Walker & Pratt Mfg. Co., Watertown, Mass., is planning to erect a foundry and warehouse, 101 x 182 feet.

The Falls Machine Co., Sheboygan Falls, Wis., is planning to erect a foundry and machine shops, to cost $90,000.

The Waterbury Brass Co., Waterbury, Conn., states that its two additional foundries are nearly completed and that the equipment has been provided for.

New pattern shops will be erected by the Ross-Meehan Foundry Co., Chattanooga, Tenn. They will be 60 x 200 feet in dimensions. Contracts for the construction have been awarded.

A new plant will be erected by the American Metal Door Co., Jamestown, N. Y., which has been incorporated with a capital of $100,000. Nels Sjohrings and others are interested.

Plans have been prepared and figures are being taken on a machine shop, 72 x 120 feet, of mill construction, to cost $30,000, to be built by William Zoeller, of 15 South Canal street, Chicago.

Contractors are figuring on plans for the construction of a new addition to the Hartford Machine Screw Co., Hartford, Conn. The present two-story building will be raised two additional stories.

The Whitin Machine Co., Whitinsville, Mass., is planning to erect 32 additional tenements in that village. The company is also building an addition to its office, 36 x 38 feet, one story.

The Standard Nut & Bolt Co., Valley Falls, R. I., has awarded the contract for a new one-story factory building, 40 x 112 feet, with a wing, 40 x 72 feet. Albert H. Humes, of Pawtucket, is treasurer of the company.

The Buckeye Steel Castings Co., of Columbus, O., is delayed in the construction of the large additions to its plant by the failure of structural steel to arrive. The new buildings will not be ready for the machinery before next March.

The Phoenix Boiler & Iron Works, Sacramento, Cal., recently incorporated by William B. Shaw and J. H. Sticker, has begun the erection of a building, 160 x 160 feet in that city, and will manufacture structural iron work, tanks and smokestacks.

The Independent Pneumatic Tool Co., Chicago, Ill., has purchased a large four-story brick building adjoining its plant at Aurora, Ill., which will give it approximately 100,000 square feet of additional floor space. The company states that it expects to install in the new building at the earliest possible date about $65,000 worth of new machinery which will double its capacity.

At a special meeting called to act upon the recommendation of the stockholders, the directors of the Youngstown Sheet & Tube Co., Youngstown, O., Jan. 15, voted to build two blast furnaces of 450 tons daily capacity and authorized the issuing of stock to the amount of $2,000,000 to complete the addition. The company is at work increasing the number of its puddling furnaces from 28 to 50.

The Nute Foundry Co., Cuyahoga Falls, O., recently incorporated, will erect a plant, 50 x 100 feet, and will remove the Nute foundry from Akron, O., into it. The new company is an incorporation of the partnership existing between T. C. Nute, of Akron, and O. M. Scherbert, of Cuyahoga Falls. Among others interested are: W. H. Schnabel, Ralph C. Heddon, T. A. Steele and C. N. Russell.

The Missouri Malleable Iron Co., East St. Louis, Ill., has under construction at its plant an addition consisting of a foundry, 85 x 218 feet, two furnace buildings, 40 x 45 feet each and an addition to the puddling and grinding department, 75 x 100 feet. The company will add four 35-ton annealing ovens, which will give it a total capacity of 535 tons. F. E. Nelson is secretary and general manager of the company.

The Russell & Erwin Mfg. Co., of New Britain, Conn., manufacturer of hardware, states that its new seven-story factory building is of slow-burning factory construction, 50 x 60 feet, and corresponds with the building erected by the company four years ago. The building is not designed for any purpose and is intended to enlarge the regular output. All of the material and equipment requirements have been provided for.

A large plant is to be erected at New Castle, Ind., by the Maxwell-Briscoe Motor Co., Tarrytown, N. Y., which will be 60 x 720 feet, two stories, consisting of a forge shop 60 x 250 feet, two stories, and a machine shop 250 x 600 feet, constituting 11 bays each 60 feet in width. A power house 50 by 200 feet will also be erected, and it is expected that the plant will be ready for occupancy by May 1. All orders for machinery and other equipment will be placed by the Maxwell-Briscoe Co., and it is understood that it will be in the market immediately.

Contracts for the construction of a new foundry have been let by the Nordberg Mfg. Co., Milwaukee, Wis. The estimated cost of the new building is $350,000. The contract calls for the completion of the building by Oct. 1. The new foundry will be located near the present plant and will be 240 x 425 feet with three cupolas for the melting of iron. The building will be of brick and steel construction. The company makes a specialty of heavy machinery castings.

The Peninsular Motor Co., Grand Rapids, Mich., states that the foundry it is building will have a molding room 50 x 98 feet, a cleaning and shiproom, 20 x 50 feet, and in connection there will be a fireproof pattern room and cupola room with floors of reinforced concrete. On one side and one end of the foundry 84 per cent of the wall space will be glass, and on the other end 46 per cent of the wall space will be glass. It is expected to equip the foundry with a No. 54 Newton cupola, and the other equipment will include electric motors, a crane, trucks, etc. Storehouses will also be erected and in the summer the company states it expects to erect a machine shop. The company specializes in the manufacture of gas engine castings.

General Industrial Notes:—

Four acres of ground and $20,000 has been offered by the McKeesport, Pa., chamber of commerce to the Barnes Safe & Lock Co., Pittsburg, to remove to that city.

The James Brown Machine Co., Pawtucket, R. I., is to be sold at auction, and J. E. Conant & Co., of Lowell, Mass., have been selected as auctioneers.

Samuel Jackson has purchased the plant of the Beard Foundry & Machine Co., Fayetteville, N. Y., from Fred N. Van Patten, of Syracuse, and will shortly put it in operation.

Hoover & Kinnear, Columbus, O., have leased the property of the Joseph Iron Co., Lodi, O., under a contingent sale agreement. The selling price of the property is $62,000.

Fred Eckert has purchased the Madison Stove Foundry, Madison, Ind., The company which is to operate the foundry consists of Louis Sulzer, I. Stern and Fred Eckert.

The Millalsin Foundry Co. has placed its new plant at Sharon, Pa., in operation. Frederick Millhouse is president of the company, John Sinclair, secretary and treasurer, and Ernest Allen, general manager.

The last of a series of three 60-ton open-hearth steel furnaces, recently built by the Standard Steel Works, at Lewiston, Pa., has been placed in operation. These furnaces have a capacity of 180 tons of steel each heat.

A modern plant for the manufacture of sulphuric acid was put in operation last week at the Vandergrift works, Vandergrift, Pa., of the American Sheet & Tin Plate Co. Its capacity is about 10,000 tons per annum.

The plant of the General Railway Signal Co., at Buffalo, has been purchased by the Century Telephone Construction Co. This plant was recently vacated by the General Railway Signal Co., which is moving to Rochester. The plant sold for $250,000.

The Meredith Construction Co., Terre Haute, Ind., states that its recent incorporation was intended to take over the established business conducted by F. C. Meredith and P. J. Meredith and to continue it along past lines. The company's equipment is complete.

The Michigan Stove Co., of Detroit, which was recently heavily damaged by fire, has been offered the free use of the Battle Creek Iron Works plant, of Battle Creek, Mich., as a temporary structure for its stove foundry. The iron works has been idle several months.

The directors of the board of trade, Marysville, O., have decided to accept the proposition of F. W. Jewell, president and general manager of the Standard Steel Tube Works, of Toledo, to move the plant to Marysville for a $3,000 bonus and the erection of a factory building.

The coal companies in the Northern Basin district of Pennsylvania estimate the output of coal for the past year as follows: Delaware & Lackawanna, 9,050,000 tons; Delaware & Hudson, 5,401,398; Pennsylvania-Erie, 5,750,000; Scranton Coal Co., 2,500,000, and Temple Iron Co., 800,000 tons.

The foundry recently operated under the name of the Gardner Foundry Co. has been purchased by Gustaf E. Hoglund and Edward G. Watkins, proprietors of the General Foundry Co., of Gardner, Mass. The latter company will be operated under the same name, in connection with the business of the General Foundry Co.

The United States Steel Corporation is trying to get a bill through the Indiana legislature to permit it to fill in submerged land in Lake Michigan, near Gary, and thereby acquire many acres of land made by dumping refuse from its steel mills into the lake. The bill says this will induce large manufacturing concerns to locate along the shore line.

The properties of the Monongahela Iron & Steel Co., Pittsburg; the New River Mineral Mining Co., Abington, Va.; the Ohio Valley Steel Foundry Co., Paden City, W. Va., and the Ivanhoe Furnace Co., have been merged under the name of the Carter Iron Co., with a capitalization of $700,000. The general offices of the company are in the Park building, Pittsburg.

L. F. Fales, Walpole, Mass., who is owner of a large machine shop in that city, has leased the foundry of the Clark Machine & Foundry Co., Franklin, Mass., and will carry on a general foundry business. David Spence, late superintendent of the Golden Mfg. Co's foundry, will be associated with him as manager, and David L. Coleman, who was assistant superintendent of the latter company, will be superintendent.

D. Leet Wilson, J. Denniston Lyon and David B. Oliver were elected directors of the Monongahela River Consolidated Coal & Coke Co., at a meeting held in Pittsburg, Jan. 16 to succeed M. H. Taylor, president of the Pittsburg Coal Co.; W. F. Woodford, vice president of the same company, and R. H. Boggs. The statement of the company for the year ended Oct. 31 was the best issued in the history of the company.

Trade Notes:—

The Kobbe Co., publisher of *Compressed Air*, announces the removal of its offices to 108 Fulton street, New York.

The largest run ever made by the tube department of the Youngstown Sheet & Tube Co., at Youngstown, O., was reached Jan. 10, when 687 tons were turned out in 24 hours.

The Woodward Iron Co. has contracted with D. Lamont & Son, engineers of Pittsburg, for the installation of four of the improved C. H. Foote fire brick stoves (two-pass type) 20 x 90 feet at its blast furnace plant at Woodward, Ala.

Seven 60-cycle induction motors ranging in size from 7½ to 15 horsepower to be used in driving machinery for the manufacture of valves and other high-grade engineering specialties have been purchased by the Lunkenheimer Co., of Cincinnati. These motors will be built by the Allis-Chalmers Co., at its Cincinnati works.

The Fawcus Machine Co., Pittsburg, has just completed building the operating machinery for the Anacostia four-track bascule bridge, near Washington, D. C. The Fawcus company manufactures cut gears, and during the past year has operated its plant 22 hours per day and added new machinery that more than doubled its output.

The Vulcan Iron Works Co., steam shovel manufacturer, Toledo, O., has materially increased the capacity of its plant during the past year by the installation of new machines of the latest and most improved types. Included in the new equipment are heavy steam hammers, lathes, boring, turning, milling, punching and shearing machines, two large water-tube boilers, with a capacity of 200 horsepower each, and a large Ingersoll-Rand air compressor with a capacity of 750 cubic feet. Another important feature is the completion of an entire new and separate shop for repair work. These conditions were brought about by the increasing demand for the Vulcan heavy duty shovels, the company having closed the most prosperous year in its history.

Fires:—

The foundry of Ingalls & Kendricken, Boston, Mass., was damaged by fire Jan. 10. The loss is estimated at $35,000.

The foundry of Heebner & Sons, Lancaster, Pa., was damaged by fire to the extent of $1,500 Jan. 8. The roof and upper part of the building were destroyed. The loss is fully covered by insurance.

The Good Will Foundry, Cincinnati, O., owned by the F. A. Klame Co., burned Jan. 11. The foundry was insured for about $55,000.

Fire destroyed the foundry building, including machine shop, pattern room and office, together with an adjoining two-story brick building of the Van Buren Foundry, Van Buren, Ark., Jan. 8, causing a loss of $20,000 with $3,000 insurance.

Fire completely destroyed the foundry of the McMyler Mfg. Co., at 8905 Loren avenue, Cleveland, Jan. 17, causing a loss of about $15,000. The cause of the fire is unknown. It is announced that the foundry will be rebuilt but it has not yet been decided whether to rebuild on the old site. The McMyler company has another plant in Cleveland and one in Warren, O., in addition to the foundry burned.